UNCLASSIFIED

Program Objectives Memorandum (POM 97-01) RDT&E Descriptive Summaries

July 1995

UNCLASSIFIED

Control Number
37115-95

ADVANCED RESEARCH PROJECTS AGENCY
3701 NORTH FAIRFAX DRIVE
ARLINGTON, VA 22203-1714

JUL 10 1995

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: POM 1997-01 Submission

Attached is the ARPA Program Objective Memorandum submission covering changes in the RDT&E requirements for FY 1997-2001 since the FY 1996 President's budget submission. Funding levels are in accordance with the fiscal guidance.

Duane A. Adams
Deputy Director

Attachment

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank,*	2. REPORT DATE	
	JULY 1995	DESCRIPTIVE SUMMARIES

4. TITLE AND SUBTITLE
Program Objectives Memorandum
(POM 97-01)
RDT&E DESCRIPTIVE SUMMARIES

5. FUNDING NUMBERS

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
ARPA
3701 N FAIRFAX DRIVE
ARLINGTON, VA 22203-1714

8. PERFORMING ORGANIZATION REPORT NUMBER
37115-95

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
ARPA
3701 N FAIRFAX DRIVE
ARLINGTON, VA 22203-1714

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
UNLIMITED

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED (A)

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

Accesion For	
NTIS CRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and / or Special
A-1	

14. SUBJECT TERMS

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

ADVANCED RESEARCH PROJECTS AGENCY

Table of Contents

		Page
SECTION I		
MODERNIZATION AND INVESTMENT		
Format C-1 -	Project Level Data - RDT&E	1
R-2 Exhibits - RDT&E Descriptive Summaries		
0602301E	Computing Systems & Communications Technology	4
0602702E	Tactical Technology	8
0602712E	Materials and Electronics Technology	18
0603226E	Experimental Eval. of Major Innovative Technology	23
0603570E	Defense Reinvestment	37
0603739E	Advanced Electronics Technologies	41
0603744E	Advanced Simulation-National Guard	59
0603805E	Dual Use Applications Programs	62
Format C-7 - Industrial Base Program Funding.....		C-7-1
SECTION II		
FORCE STRUCTURE		
Format A-8 - Programmed Structure, Programmed Manning, and End Strength		A-8-1
SECTION III		
INSTALLATION CONSTRUCTION, BASE OPERATING SUPPORT, AND ENVIRONMENT		
Format E-13 -	Environmental Security Technology	E13-1
SECTION IV		
MANPOWER		
Format F-10 -	Civilian Employment Levels and Associated Payroll Costs	F-10-1
SECTION V		
INFORMATION MANAGEMENT		
Format G-2B -	All Other IT Costs by CIM Area (Category 5 only)	G-2B-1

ADVANCED RESEARCH PROJECTS AGENCY
RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSEWIDE
PROJECT LEVEL SUMMARY REPORT
($ in millions)

POM 97

RE	PROJ	TITLE	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
61101E	CCS-02	INFORMATION SCIENCES	23.863	24.776	28.443	30.805	32.300	34.500	35.700
	ES-01	ELECTRONIC SCIENCES	35.224	42.600	40.150	37.578	39.233	43.778	47.533
	MS-01	MATERIALS SCIENCES	28.465	22.356	23.928	27.061	27.853	25.253	27.053
	61101E	**DEFENSE RESEARCH SCIENCES**	**87.552**	**89.732**	**92.521**	**95.444**	**99.386**	**103.531**	**110.286**
62301E	ST-01	JASONS	1.227	1.195	1.196	1.190	1.200	1.200	1.200
	ST-11	INTELLIGENT SYSTEMS & SOFTWARE	75.981	95.038	100.228	142.394	108.807	138.407	155.007
	ST-19	HIGH PERFORMANCE COMPUTING	241.220	234.614	224.235	230.260	247.503	289.034	303.484
	ST-22	SOFTWARE ENGINEERING TECHNOLOGY	40.354	19.177	19.088	18.678	20.250	23.250	25.136
	ST-23	MONITORING TECHNOLOGIES	20.209	18.851	15.030	0.000	0.000	0.000	0.000
	ST-24	DEFENSIVE INFORMATION WARFARE	10.000	35.000	25.000	25.000	55.000	35.000	38.900
	62301E	**COMPUTING SYS & COMM TECHNOLOGY**	**388.991**	**403.875**	**384.777**	**417.522**	**432.760**	**486.891**	**523.727**
62702E	TT-03	NAVAL WARFARE TECHNOLOGY	49.423	39.688	50.913	70.410	73.687	74.407	79.173
	TT-04	ADVANCED LAND SYSTEMS TECHNOLOGY	30.239	34.087	25.973	30.136	50.000	54.686	66.686
	TT-05	ADVANCED TARGETING TECHNOLOGY	5.848	0.000	0.000	0.000	0.000	0.000	0.000
	TT-06	ADVANCED TACTICAL TECHNOLOGY	36.157	39.393	32.763	42.028	45.292	51.127	52.527
	62702E	**TACTICAL TECHNOLOGY**	**121.667**	**113.168**	**109.649**	**142.574**	**168.979**	**180.220**	**198.386**
62708E	IC-03	**INTEGRATED COMMAND & CONTROL TECH**	**81.554**	**48.000**	**67.603**	**68.000**	**68.000**	**68.000**	**68.000**
62712E	MPT-01	MATERIALS PROCESSING TECHNOLOGY	148.627	122.741	146.258	160.887	167.249	175.494	214.240
	MPT-02	MICROELECTRONIC DEVICE TECHNOLOGIES	92.942	62.221	76.526	92.233	108.259	131.169	165.999
	MPT-06	CRYOGENIC ELECTRONICS	17.672	11.996	12.193	13.240	5.183	7.546	10.000
	MPT-07	MILITARY MEDICAL/TRAUMA CARE TECHNOLOGY	14.873	29.087	29.265	32.138	38.012	44.500	48.500
	62712E	**MATERIALS & ELECTRONICS TECHNOLOGY**	**274.114**	**226.045**	**264.242**	**298.498**	**318.703**	**358.709**	**438.739**
63226E	EE-21	COMMAND & CONTROL INFORMATION SYSTEMS	55.002	61.361	38.624	50.600	74.237	81.687	99.034
	EE-27	ADVANCED SPACE TECHNOLOGY PROGRAM	62.785	0.000	0.000	0.000	0.000	0.000	0.000
	EE-34	GUIDANCE TECHNOLOGY	10.120	26.150	29.673	32.000	21.600	17.000	20.000
	EE-36	ADVANCED SHIP/SENSOR SYSTEMS	34.348	16.502	33.513	45.614	51.550	53.050	68.050
	EE-37	ADVANCED SIMULATION	82.656	79.065	44.329	34.367	40.853	67.653	75.353
	EE-39	UNMANNED UNDERSEA VEHICLE SYSTEMS	37.430	16.836	17.469	17.395	18.115	21.115	26.115
	EE-40	CRITICAL MOBILE TARGETS	117.338	117.759	112.803	128.387	149.110	159.410	167.860
	EE-41	AIR DEFENSE INITIATIVE	34.718	23.476	24.777	35.029	31.989	46.989	68.989

ADVANCED RESEARCH PROJECTS AGENCY
RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSEWIDE
PROJECT LEVEL SUMMARY REPORT
($ in millions)

POM 97

RE	PROJ	TITLE	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
	EE-45	GLOBAL GRID COMMUNICATIONS	43.979	45.188	44.584	43.592	23.916	22.935	29.549
	EE-46	DEFENSE SIMULATION INTERNET (DSI)	16.622	27.514	37.175	0.000	0.000	0.000	0.000
	EE-CLS	CLASSIFIED	176.794	204.154	212.887	209.100	216.145	238.141	283.349
	63226E	EEMT	671.792	618.005	595.834	596.084	627.515	707.980	838.299
63569E	AS-01	ADVANCED SUBMARINE TECHNOLOGY	32.381	7.473	9.942	5.449	5.430	26.230	35.530
63570E	PT-01	DUAL USE TECHNOLOGY PARTNERSHIPS	245.000	0.000	0.000	0.000	0.000	0.000	0.000
	PT-03	COM-MIL INTEGRATION PARTNERSHIPS	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	PT-04	REGIONAL TECHNOLOGY ALLIANCES	48.196	0.000	0.000	0.000	0.000	0.000	0.000
	PT-08	ADVANCED MANUFACTURING TECH PARTNERSHIPS	30.000	0.000	0.000	0.000	0.000	0.000	0.000
	PT-10	MFG ENGINEERING EDUCATION PROGRAM	20.000	0.000	0.000	0.000	0.000	0.000	0.000
	PT-99	DEFENSE REINVESTMENT	0.000	500.000	0.000	0.000	0.000	0.000	0.000
	63570E	DEFENSE REINVESTMENT	443.196	500.000	0.000	0.000	0.000	0.000	0.000
63739E	MT-01	MICROELECTRONICS FABRICATION (DUAL USE APPL)	0.000	1.907	50.000	50.000	50.000	50.000	50.000
	MT-02	MMIC	20.472	0.000	0.000	0.000	0.000	0.000	0.000
	MT-03	INFRARED FOCAL PLANE ARRAY	44.116	36.744	19.276	0.000	0.000	0.000	0.000
	MT-04	ELECTRONIC MODULE TECHNOLOGY	119.084	134.473	133.814	150.089	163.372	209.064	233.034
	MT-05	TACTICAL INFORMATION SYSTEMS	14.652	20.164	17.721	14.835	21.646	23.000	27.500
	MT-06	MICROWAVE & ANALOG FRONT END TECHNOLOGY	22.253	50.741	52.921	54.981	55.201	62.467	68.012
	MT-07	CENTERS OF EXCELLENCE	38.377	23.642	0.000	0.000	0.000	0.000	0.000
	MT-08	MANUFACTURING TECHNOLOGY APPLICATIONS	54.738	78.942	76.248	57.405	35.000	35.000	40.000
	MT-10	ADVANCED LITHOGRAPHY	57.731	39.003	51.404	55.300	50.000	45.000	45.000
	MT-11	COMPUTER AIDED ACQ AND LOGISTICS SUPPORT (CALS)	38.340	34.247	10.604	0.000	0.000	0.000	0.000
	63739E	ADVANCED ELECTRONICS TECHNOLOGIES	409.763	419.863	411.988	382.610	375.219	424.531	463.546
63744E	SM-01	ADVANCED SIMULATION - NATIONAL GUARD	29.537	5.799	0.000	0.000	0.000	0.000	0.000
63745E	EM-01	SEMICONDUCTOR MANUFACTURING TECHNOLOGY	89.227	89.554	0.000	0.000	0.000	0.000	0.000
63746E	MR-01	MARITIME TECHNOLOGY	52.000	49.657	49.708	50.000	0.000	0.000	0.000
63747E	EV-01	ELECTRIC VEHICLES	15.000	0.000	0.000	0.000	0.000	0.000	0.000

ADVANCED RESEARCH PROJECTS AGENCY
RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSEWIDE
PROJECT LEVEL SUMMARY REPORT
($ in millions)

POM 97

PE	PROJ	TITLE	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
63800E	JA-01	JOINT ADVANCED STRIKE TECHNOLOGIES	0.000	30.675	80.925	83.922	19.000	16.000	10.000
63805E	GC-01	DUAL USE APPLICATIONS PROGRAMS	0.000	0.000	300.000	300.000	300.000	300.000	300.000
65114E	BL-01	BLACKLITE	4.875	4.745	4.730	4.683	5.000	5.000	5.000
65898E	MH-01	MANAGEMENT HEADQUARTERS (R&D)	30.218	32.643	33.881	34.814	35.808	36.308	36.987
		AGENCY TOTAL	2731.867	2639.234	2405.800	2479.600	2455.800	2713.400	3028.500
	BA-01	TOTAL	87.552	89.732	92.521	95.444	99.386	103.531	110.286
	BA-02	TOTAL	866.326	791.088	826.271	926.594	988.442	1093.820	1228.852
	BA-03	TOTAL	1742.896	1721.026	1448.397	1418.065	1327.164	1474.741	1647.375
	BA-06	TOTAL	35.093	37.388	38.611	39.497	40.808	41.308	41.987
		AGENCY TOTAL	2731.867	2639.234	2405.800	2479.600	2455.800	2713.400	3028.500

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Computing Systems and Communications Technology, PE 0602301E

COST *(In Millions)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Information Survivability ST-24	0	10,000	35,000	25,000	25,000	55,000	35,000	38,900	0	218,900

(U) **Mission Description:** This project develops the technology base underlying the solutions to protect DoD's mission-critical information systems against attack upon or through the supporting infrastructure. These technologies lead to generations of stronger protection, higher performance, and more cost-effective security solutions scalable to several thousand sites and to high performance computing technologies. Technologies developed under this project will be exploited in High Performance Computing (ST-19) and other defense programs to satisfy defense requirements for secure and survivable systems. This program is an expansion of investments in information security made previously in High Performance Computing.

(U) Information Survivability focuses on early prototypes of software and hardware technologies leading to scalable protection for large-scale, heterogeneous systems usable over a wide range of performance in diverse threat environments. High assurance networking technologies will be developed consisting of security mechanisms and value-added security services for integration into network technologies, as well as robust networking protocols designed to ensure continuous operation in hostile environments. High assurance computing systems will be developed that provide modular security services and mechanisms, provide high reliability for distributed computations, and allow geographically-separated parts of an organization to interact as if they shared a common security perimeter. This also includes secure and fault-tolerant operating systems, firewalls, and system management tools. Assurance and integration tools will allow the development of high assurance and trusted systems that add expression of modular system structures, networking, and other distributed-system protocols and the ability to reason about their security and robustness properties.

(U) In later years (FY 1999 and beyond), national computing infrastructure vulnerabilities that could be exploited by an information warfare enemy will be identified and technologies developed to mitigate these vulnerabilities. Intrusion-detection systems will allow attacks on the defense infrastructure to be detected, the damage to be assessed, and appropriate response to be taken. Technologies will be developed to allow crisis-mode operation of critical infrastructure components. Key information warfare concepts will be incorporated into models and simulations for wargaming and decision-making.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Computing Systems and Communications Technology, PE 0602301E, Project ST-24

(U) Consistent with an alignment of this project with Defensive Information Warfare needs, this Descriptive Summary shows a renaming of the focus areas of the project as follows: Tools for Network Security has become High Assurance Networking and Secure Computing Systems has become High Assurance Computing Systems.

(U) **Program Accomplishments and Plans**:

(U) FY 1995 Program:

- High Assurance Networking. ($7.0M)
  - Develop basic authentication and authorization mechanisms based on digital signatures, cryptography, and privacy-enhanced mail for use in a common infrastructure.
  - Begin operation of certification authority supporting privacy-enhanced mail and other secure services.
  - Complete prototype implementation of digital signature hierarchy toolkit and domain-name system enhancements.
  - Demonstrate prototype signature/timestamp server with associated access tools for location-independent object security.
- High Assurance Computing Systems. ($3.0M)
  - Complete proof-of-concept Asynchronous Transfer Mode (ATM) encryption units for use in experimental ATM networks.
  - Demonstrate operating system capability for strict process separation.

FY 1996 Program:

- High Assurance Networking. ($8.3M)
  - Demonstrate prototype of secured routing protocols.
  - Release initial prototype of system security checking tools for use in security monitoring and incident response.
- High Assurance Computing Systems. ($10.1M)
  - Demonstrate cryptographic-applications programming interface to allow secure applications to be built independent of the cryptography used.
  - Demonstrate high-assurance microkernel for use in secure operating systems.
- Assurance and Integration. ($5.6M)
  - Complete development of a prototype toolkit supporting secure distributed applications over a single administrative domain.
- Survivability and Vulnerabilities. ($11.0M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Computing Systems and Communications Technology, PE 0602301E, Project ST-24

- Small-scale demonstrations of techniques for survivability and recoverability in electronic communications, and information systems of critical importance to DoD.

(U) FY 1997 Program:

- High Assurance Networking. ($6.0M)
  - Demonstrate incident response tools to detect corrupted code and signs of penetration.
  - Integrate basic security services into critical networking protocols for enhanced infrastructure protection.
- High Assurance Computing Systems. ($8.0M)
  - Develop services for defining and enforcing configurable security policies in secure operating systems.
  - Demonstrate auditing, intrusion detection, authentication, and authorization components of firewalls.
  - Demonstrate transparent application interoperability across firewalls.
- Assurance and Integration. ($4.0M)
  - Demonstrate enhancements to secure distributed application tools to support operation across multiple administrative domains.
- Survivability and Vulnerabilities. ($7.0M)
  - Validate techniques for permitting real-time tradeoffs between security, reliability, and recoverability in critical defense experimental systems.

(U) WORK PERFORMED BY: Institute for Defense Analysis, Alexandria, VA; University of Arizona, Tucson, AZ; Carnegie-Mellon University, Pittsburgh, PA; UC Davis, Davis, CA; Bolt Beranek & Newman Systems & Technology, Cambridge, MA; MCNC, Research Triangle Park, NC; Trusted Information Systems, Glenwood, MD; University of Southern California, Information Sciences Institute, Marina Del Rey, CA; AT&T, Whippany, NJ; Massachusetts Institute of Technology, Cambridge, MA; University of California, Los Angeles, CA; Bellcore, Red Bank, NJ; Naval Research Laboratory, Washington, DC; SRI, Menlo Park, CA; Open Market, Cambridge, MA; Reliable Software Tecnologies Corp., Sterling, VA; Portland State University, Portland, OR; University of California, Santa Barbara, CA; Cornell University, Ithaca, NY; Odyssey Research, Ithaca, NY; University of Michigan, Ann Arbor, MI; IBM, Austin, TX; Martin Marietta, Baltimore, MD.

(U) RELATED ACTIVITIES: Program Element 0602301E, Project ST-19, High Performance Computing.

(U) OTHER APPROPRIATION FUNDS: None.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Computing Systems and Communications Technology, PE 0602301E, Project ST-24

(U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	0	10.0	35.0	25.0
Appropriated	0	10.0	N/A	N/A
Current Budget	0	10.0	35.0	25.0

(U) **Change Summary Explanation**:

No Change.

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Naval Warfare Technology TT-03	26,421	49,423	39,688	50,913	70,410	73,687	74,407	79,173	Continuing	Continuing

(U) **Mission Description:** The Naval Warfare Technology project develops advanced technologies for application to a broad range of naval requirements. The enabling technologies include: virtual prototyping and advanced modeling to radically change the DoD acquisition process through integrated product and process design; Command, Control, Communications, and Intelligence/Synthetic Environments (C3I/SE) for littoral warfare; intermodal transportation and logistics technologies for strategic mobility; and integrated ship sensor, weapons and platform technologies to demonstrate the feasibility of reduced ship manning.

(U) The Simulation Based Design (SBD) area is developing and demonstrating a prototype system that will enable a revolutionary change in the acquisition process for large, complex systems. The objective of SBD is to integrate the technologies of distributed interactive simulation, physics-based modeling, and virtual environments and apply them to the design, acquisition, and life cycle support processes of complex systems. SBD will utilize virtual prototypes in synthetic environments to enable effective, integrated product and process development. Complete simulation from early in the concept formulation stage through verification of requirements to design, manufacture, operation, training, and logistics will be available prior to initiation of construction. This will permit realistic assessments of a candidate design throughout its lifetime. The system will provide significant cost savings through the reduction of the number of expensive physical mockups, the total time for product acquisition, and the manufacturing inefficiencies caused by inadequate design.

(U) In the C3I/SE area, advanced information and communications technologies are being developed in support of the situational assessment, planning, and maritime mobile communications functions inherent in Fleet Commander in Chief (CINC) Command Centers, major CONUS support commands ashore, and maritime mobile and theater shipboard Joint Task Force (JTF) Command Centers. The demonstration systems incorporate embedded internetted simulation capability for collaborative planning, evaluation, and rehearsal of all phases of operations including transportation, with Joint Task Force (JTF) mobile and fixed units. The demonstration systems will include capabilities for high-bandwidth communications to ships and aircraft at sea based on capitalizing on emerging commercial and military communications advancements. It also develops the Synthetic Test Range (STR), which in conjunction with the SBD development, is aimed at improving the acquisition process. The STR will also improve training, readiness, and operations planning and rehearsal of the maritime component of U.S. forces. The C3I/SE Program builds upon existing ARPA-developed planning tools such as the Capability Assessment and Evaluation System (CASES), the Acoustic Warfare Integration

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-03

Laboratory (AWIL), and the Maritime Anchor Desk, while identifying and incorporating other emerging C3I and information system technologies.

(U) In the Ship Systems Automation (SSA) area, advanced, highly automated sensor, weapons control, and platform systems (including damage control) are being developed and demonstrated for submarine and surface ship applications. Through evolving sequential demonstrations of the technologies and their interactions, efforts in this area will show how an integrated system could achieve a significant reduction in crew size. Because personnel account for about 25% of ship life cycle costs, such a reduction would lead to immediate and long term cost savings for ship acquisition programs. SSA technology developments include intelligent command-level decision support components, scalable sensor integration work stations to fuse multi-source data and intelligently display the tactical situation on a tactical situation assessment system, cooperating expert systems conducting mission-context/sensor employment planning, and integrated internal condition sensor and control systems to intelligently display and control ship physical conditions on a ship's internal assessment system.

(U) TRANSTECH will develop the capability to assist the military transportation community in the simultaneous exploration of end-to-end solutions to 21st century transportation requirements. A transportation synthetic environment will allow planning, real-time operations execution, and re-planning, as well as infrastructure investment and policy decisions. This program has four primary technology development areas: TRANSim, the computer framework that enables the synthetic transportation environment; Operations and logistics tools that enable planning, rehearsal, and execution; Infrastrucure investment planning tools that enable investment and policy decisions to be made on the transportation infrastructure; and "modal technologies", those peculiar to the particular mode of transportation. This area is focused on gateways and enabling technologies, such as automated indentification technologies, cargo handling, at-sea off-load technology, and packaging technology.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Conducted the final Simulation Based Design (SBD) feasibility demonstration showing real-time interaction in a virtual environment, seamlessly integrating component production from design through manufacture; initiated the development of key enabling technologies. ($8.4M)
- Initiated development of process models to enable agile manufacturing in shipyards. ($0.9M)
- Demonstrated a full fidelity acoustic synthetic ocean environment simulation capability and commenced development of a synthetic electromagnetic environment. ($3.2M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-03

- Initiated development of an integrated situation assessment, planning, and planning assessment architecture and associated wideband communications antenna technologies for Fleet Commander in Chief (CINC) and shipboard Commander Joint Task Force (CJTF) command complexes. Demonstrated connectivity and initial assessment capabilities. ($5.9M)
- Developed the architecture for SSA in the four major operator/associate areas of Tactical Scene, Tactical Action, Platform Readiness, and Command & Control; conducted initial laboratory demonstration of the Tactical Scene Operator/Associate area. ($3.0M)
- Pursued new and follow-on efforts for the Center of Excellence for Research in Ocean Sciences (CEROS) ocean science efforts. ($5.0M)

(U) FY 1995 Program:

- Initiate SBD prototype development and conduct initial demonstration using the facilities of a regional design center. ($15.7M)
- Create a virtual prototype of a large complex system for application and analysis in the early requirements phase. ($3.1M)
- Conduct interim demonstrations of Simulation,Based Design (SBD) critical enabling technologies. ($5.6M)
- Conduct demonstrations of distributed multiyard concepts for ship construction. ($.9M)
- Demonstrate an initial integrated Command, Control, Communication, and Intelligence/Synthetic Environment (C3I/SE) architecture in a selected maritime theater-wide planning/planning assessment scenario linked to an at-sea Commander Joint Task Force (CJTF) during JWID-95. Conduct at-sea demonstration of advanced technology wideband satellite network communications between the Commander-in-Chief (CINC) and mobile Commander Joint Task Force (CJTF) command complexes. ($6.6M)
- Expand synthetic environment development to include a complete electromagnetic environment creating a multi-spectral Maritime Synthetic Test Range (STR). Conduct initial high fidelity radar stimulation with an operational radar system. ($2.2M)
- Conduct Ship Systems Automation (SSA) demonstrations with emphasis on Platform Readiness, interactive component technologies, and force multiplier technologies that support significantly reduced manning on warships. ($8.3M)
- Initiate new and follow-on efforts for the Center of Excellence for Research in Ocean Sciences (CEROS) ocean science efforts. ($7.0M)

(U) FY 1996 Program:

- Conduct interim SBD prototype demonstrations on a complex application at a design center, using virtual prototyping technologies. ($10.3M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-03

- Demonstrate multi-spectral Synthetic Test Range (STR) with multiple targets and dynamic weather in an advanced demonstration. ($1.7M)
- Demonstrate C3I/SE advanced littoral planning at the afloat numbered fleet commander and below. ($5.0M)
- Conduct land-based Navy laboratory simulation/stimulation demonstrations of SSA interactive component technologies in Platform Readiness and Combat Systems focused areas. ($6.8M)
- Demonstrate advanced SSA algorithm and integration verification in coordination with Navy and university laboratories. ($4.1M)
- Investigate and begin development of sonar system based on biological sonar architectures. ($.5M)
- Initiate development of a full fidelity transportation synthetic environment. ($6.1M)
- Complete assessment of Logistic Over the Shore (LOS) technology opportunities. ($1.0M)
- Investigate Total Asset Visibility (TAV) technology opportunities and initiate development of advanced tagging/location, systems and software. ($4.2M)

(U) FY 1997 Program:

- Conduct interim Simulation Based Design (SBD) prototype demonstrations on a complex application using advanced virtual prototyping technologies. ($14.2M)
- Demonstrate Command, Control, Communication, and Intelligence/Synthetic Environment (C3I/SE) maritime mission planner for amphibious and Special Operation forces (SOF) raids. ($5.9M)
- Demonstrate a synthetic electromagnetic environment (Synthetic Test Range) for ship defense systems. ($1.4M)
- Conduct an integrated, fully-reactive interactive land-based demonstration of all Ship Systems Automation (SSA) Operator/Associate pairs interacting Combat and Platform Systems in a Ship Information Center (SIC) of the future facility. ($9.7M)
- Demonstrate distributed transportation simulation in support of military transportation planning/replanning for a major regional contingency. ($12.0M)
- Begin TAV/LOS technologies demonstration. ($7.7M)

(U) **Program Change Summary:** *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	26.5	33.4	39.7	55.9
Appropriated	26.5	49.4	N/A	N/A
Current Budget	26.4	49.4	39.7	50.9

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-03

(U) **Change Summary Explanation**:

FY 1994 Reduction of $0.1 million reflects minor repricing.
FY 1997 Decrease reflects elimination of interim demonstrations of SBD enabling critical technologies

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Advanced Tactical Technology TT-06	27,293	36,157	39,393	32,763	42,028	45,292	51,127	52,527	Continuing	Continuing

(U) **Mission Description:** This project focuses on the technology and applications of compact lasers, microwave radiation sources, advanced displays and mathematical algorithms for signal processing to dramatically improve the performance of radars, sensors, and systems for electronic warfare, targets recognition, and military communications. Seven broad technology areas are being investigated: (a) compact, efficient, frequency-agile, diode-pumped, solid-state lasers for infrared countermeasure, laser radars and sensors; (b) compact high density data storage for high bandwidth image processing; (c) high performance, pulsed radio frequency (RF) radiation sources for smaller and better microwave tubes; (d) fast computational algorithms for signal processing, target recognition and tracking, electromagnetic and acoustic propagation in nonlinear medium; (e) passive infrared signature suppression to counter the predominate air-to-air missile threats; and (f) precision optics components for critical DoD applications.

(U) **Program Accomplishments and Plans**:

(U) FY 1994 Accomplishments:

- Compact Laser ($5.9M): Performed technology demonstration of power laser operation at one micron; semiconductor diodes for laser pumping; and active target acquisition for infrared countermeasure and laser radars.
  - Demonstrated one kilowatt average power one micrometer wavelength laser.
  - Demonstrated new semiconductor laser diodes operating at 808 nanometer wavelength.
  - Demonstrated wavefront aberration corrections for active pointing and tracking.
  - Demonstrated design concepts for high repetition rate infrared countermeasure laser.
- Holographic Data Storage ($2.5M): Demonstrated new hologram fixing and multiplexing techniques for holographic data storage system.
- Pulsed Radio Frequency (RF) ($10.2M): Designed and fabricated advanced RF radiation sources for radar and RF countermeasure.
  - Designed and fabricated electronic system to demonstrate cooperative angle jamming technique.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-06

- Designed and fabricated 44 gigahertz (GHz) solid state, high efficiency amplifiers for space applications.
- Designed microwave power tube using microcathode to operate at 10 GHz.
- Demonstrated high performance 94 GHz amplifier operation and began prototype design.
- Designed, fabricated and demonstrated ultra high resolution radar operation using electromagnetic shockline technology.

• Fast Computational Algorithms ($8.7M): Began to develop novel algorithms for automatic detection and recognition of difficult-to-find objects.
- Developed wavelet-based multi-resolution methods and design tools for new digital filters.
- Demonstrated wavelet methods for detection of transient signals in sonar systems and for multisensor fusion.
- Demonstrated robust methods for direction finding and interference reduction in airborne platforms.
- Developed code for fast computation of electromagnetic scattering.

(U) FY 1995 Program:

• Compact Lasers ($5.0M): Demonstrate breadboard systems of compact high power lasers at one micron, tunable mid-infrared lasers, aluminum free laser diodes and active tracking systems at mid infrared wavelengths.
- Demonstrate transportable brassboard one kilowatt average power one micrometer wavelength laser with output at 10 Joule/100 Hertz (Hz), 10 nanosecond pulse length.
- Demonstrate laser diode bar arrays at continuous wave and quasi-continuous wave output at 808 nanometers.
- Demonstrate laboratory breadboard tunable mid-infrared lasers for U.S. Army advanced technology infrared countermeasure program.
- Demonstrate and test a laboratory breadboard active tracking system for mid-infrared wavelengths.

• Holographic Data Storage ($6.5M): Technology demonstration of page-format, high density input and readout capability.
- Demonstrate prototypes of test charge coupled devices, spatial light modulators and experimental validation of concept for holographic recording through waveguides.

• Pulsed Radio Frequency (RF) ($6.6M): Continue fabrication and integration of advanced RF amplifiers and power combining techniques.
- Fabricate triode amplifier using microcathode operating at 10 gigahertz (GHz).
- Design and fabricate prototype high performance 94 GHz power amplifier.
- Demonstrate high efficiency power combining technique of solid state devices operating at 44 GHz.
- Design reconfigurable antenna using microtip and diode laser technology.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-06

- Fast Computational Algorithms ($12.7M): Continue development of novel algorithms for automatic target detection, materials and microelectronics processing.
  - Develop and test novel wavelet-based algorithms and tools for digital processor and filters.
  - Develop methods for multiresolution synthetic aperture radar and adaptive waveform design.
  - Apply wavelet design tools to tactical communications and target recognition.
  - Demonstrate fast multipole radar cross section code for an order-of-magnitude increase in capability.
  - Develop simulation tools, signal processing and modern control methods for in-situ sensing and real-time control of materials and microelectronics processing.
  - Develop optimal phase-shift mask design methods.
- Miniature Small Engine Application Program (SENGAP) turbine engine ($3.6M): Flight test miniature SENGAP engine to validate successful bench testing and integration with decoy air vehicle concept.
- Advanced Infrared Signature Suppression ($1.8M):
  - Phase 2:
    -- Bench test cooling system concept, thermodynamics of the system and the absolute value of the skin temperature.
    -- Document results in Phase 2 final report.
  - Phase 3:
    -- Design cooling panel for NASA F-15 Pod.

(U) <u>FY 1996 Program</u>:

- Compact Lasers ($7.0M): Demonstrate compact lasers and active tracking systems at mid-infrared wavelengths for IR countermeasures.
  - Demonstrate mid-infrared lasers, packaged for slow motion, dynamic testing.
  - Demonstrate and test compact active tracking system brassboard for mid-infrared wavelengths.
- Holographic Data Storage ($6.0M): Technology demonstration to establish system trade-offs of various candidate materials for holographic data storage.
  - Demonstrate proof-of-principle digital holographic data storage devices to establish the capability of various multiplexing methods and error detection and correction schemes.
- Pulsed Radio Frequency (RF) ($3.3M): Continue fabrication and demonstration of advanced RF amplifiers and power combining techniques.
  - Demonstrate low voltage operation of microtriode amplifier operating at high frequency.
  - Demonstrate high efficiency power combining technique of solid state amplifiers.
- Fast Computational Algorithms ($7.6M): Complete development of novel algorithms for automatic target detection and recognition; validate and begin transition.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-06

- Demonstrate wavelet-based methods for data compression and clutter/noise removal.
- Demonstrate wavelet-based methods for automatic target detection and recognition.
- Demonstrate multiresolution methods and adaptive waveforms for image formation and processing.

• Precision Optics Technology ($5.8M): Develop conformal and off-axis optical components for next generation tactical systems using computer-aided design and manufacturing.
- Establish deterministic microgrinding and surface finishing techniques for reflective and refractive optical elements.

• Advanced Infrared Signature Suppression ($4.8M): Integrate and demonstrate (flight test) long-wave Infrared (LWIR) suppression system. Initiate development of advanced infrared (IR) suppression technologies for advanced aircraft.

• Agile Warrior/"hybrid reality" displays ($4.9M): Develop fast, high resolution panoramic visual display medium; demonstrate high network throughput with multiple dynamic, visual entities while retaining resolution, realism and precision.

(U) FY 1997 Program:

• Compact Lasers ($7.2M): Demonstrate breadboard systems of compact high power tunable mid-infrared lasers, and laser diodes operating at mid-infrared wavelengths.
- Demonstrate laboratory breadboard tunable mid-infrared lasers at 20 watt output with 20 Kilohertz (KHz) pulse repetition rate for large aircraft infrared countermeasures.
- Demonstrate mid-infrared laser diodes.

• Holographic Data Storage ($5.0M): Technology demonstration to establish functional limits of holographic data storage.
- Demonstrate holographic data storage testbeds for functional evaluation of write once read many (WORM) storage systems.

• Fast Computational Algorithms ($6.1M): Transition novel algorithms for automatic target detection and recognition to selected applications.
- Complete final algorithm selection and validation for system insertion.

• Precision Optics Technology ($10.0M): Continue development of comformal and off-axis optical components for tactical systems.
- Model ion exchange and synthesize materials with varying index of refraction in the visible and infrared ranges.

• Advanced Infrared Signature Suppression ($4.5M): Continue development of advanced IR suppression technologies for advanced aircraft.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Tactical Technology, PE 0602702E, Project TT-06

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	26.3	38.9	39.4	42.8
Appropriated	26.3	36.2	N/A	N/A
Current Budget	27.3	36.2	39.4	32.8

(U) **Change Summary Explanation**:

FY 1994 Adjustments reflect minor program repricing.
FY 1997 Decrease due to termination of Agile Warrior program.

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Materials and Electronics Technology, PE 0602712E

COST *(In Millions)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Microelectronic Device Technologies MPT-02	94,333	92,942	62,221	76,526	92,233	108,259	131,169	165,999	Continuing	Continuing

(U) **Mission Description**: This element develops advanced electronic and optoelectronic devices, semiconductor process tools and methodologies, materials for optoelectronics and infrared devices. Areas of emphasis include high performance analog-to-digital converters (ADCs), military optical processors, novel optoelectronic devices and modules, artificial neural network technology and low power electronics. This microelectronics development project creates the technology base for advanced electronic and optoelectronic components to meet DoD needs. In this project, the feasibility of promising research results are developed to the point where their military utility can be determined. Many of the tasks in this project culminate in a subsystem prototype insertion demonstration.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Tested first iteration GaAs hetero-junction bipolar transistor (HBT)-based ADCs for sampling speed and dynamic range. ($7.0M)
- Completed design and demonstration of GaAs HBT-based ADCs support components, such as multi-plexers and demultiplexers. ($4.0M)
- Initiated effort to develop a design system for circuits operating above 10 GHz. ($2.4M)
- Initiated development of neural network-based systems for signal processing applications (including signal demodulation, noise removal, face recognition, character recognition, large-vocabulary speech recognizers and multi-modal command systems for computer interfaces). ($4.0M)
- Developed neural network automatic target recognizer for future insertion into the Comanche Helicopter. ($.8M)
- Demonstrated electronic neural network hardware boards with speeds of up to 10 billion operations per second, and developed component technologies for optoelectronic systems that promise up to 10 trillion operations per second. ($3.0M)
- Completed studies on requirements and candidate hardware/software designs for an Advanced Vision System (AVIS) that will accelerate image processing and recognition algorithms. ($2.9M)
- Demonstrated optically controlled phased arrays and fiber-optic-based bi-static radar. ($2.7M)
- Demonstrated optical pattern recognition modules. ($2.2M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Materials and Electronics Technology, PE 0602712E, Project MPT-02

- Demonstrated acousto-optic pulse compression signal processor and jammer nulling processor. ($2.5M)
- Demonstrated optical electronic warfare channelizer and precision direction finder. ($1.7M)
- Developed packaged optoelectronic-microwave modules for microwave transmission. ($1.0M)
- Developed integrated monolithic tunable laser arrays. ($2.7M)
- Initiated efforts to develop low-cost optoelectronic modules. ($16.5M)
- Developed optoelectronic packages that incorporate passive alignment techniques between fibers and component input/output (I/O). ($4.5M)
- Established consortia for rapid automated optical alignment packaging and for accelerated development of blue lasers for insertion into laser memory disk systems. ($8.0M)
- Improved ferroelectric memory cell performance, especially imprint characteristics. ($1.4M)
- Initiated optical and electrical characterization of III-V bulk materials for optoelectronic and infrared device applications. ($2.5M)
- Initiated fabrication and evaluation of wide band gap II-VI blue emitters produced on III-V substrates. ($4.0M)
- Completed design of crystal growth system for 1kg InGaAs boule for 50mm diameter substrates. ($3.0M)
- Initiated program to optimize computer architecture and supporting design systems that fully exploit area array interconnects and multi-chip-module packaging. ($8.5M)
- Initiated program to demonstrate speed optimization with cryo-cooling. ($7.0M)
- Initiated a program to demonstrate a large format plasma processing of chemical vapor deposition (CVD) diamond. ($2.0M)

(U) FY 1995 Program:

- Validate high speed heterojunction bipolar transistor (HBT) technology by manufacturing components on pilot production lines. ($17.5M)
- Demonstrate the high-speed HBT process via components in a system application. ($2.4M)
- Establish transitions for mature neural network signal processing systems (including signal demodulators and adaptive filters), and continue development of high-performance end-to-end systems (including multi– module computer interfaces and image and character recognition systems. ($4.0M)
- Comprehensively test neural network target recognizer in preparation for insertion into Comanche Helicopter. ($1.0M)
- Complete electronic neural network boards and demonstrate on realistic applications; demonstrate optoelectronic hardware at 1 trillion operations per second. ($4.7M)
- Establish the Advanced Vision Systems (AVIS) architecture framework and design custom chips. ($5.0M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Materials and Electronics Technolgoy, PE 0602712E, Project MPT-02

- Establish Advanced Vision Systems (AVIS) software requirements and initiate software development (including custom compilers, languages, debuggers, case tools, libraries, and environments). ($2.5M)
- Develop key components for affordable optoelectronic modules. ($10.0M)
- Field demonstration of optical pattern recognition modules, optical real-time synthetic aperture radar processor and pulse compression signal processor. ($1.0M)
- Demonstrate advanced serial and parallel optoelectronic busses. ($6.0M)
- Initiate insertion of prototype optoelectronic modules into system applications. ($5.0M)
- Develop 3.3 volt silicon on insulator (SOI) technology. ($8.0M)
- Develop unit simulation CAD tools. ($2.8M)
- Initiate consortium in nanolithography, nanoelectronics, and high-speed supercomputer visualization. ($9.0M)
- Initiate seeded growth of cadmium zinc telluride boules to achieve large, single crystal substrate material with controlled orientation. ($6.5M)
- Demonstrate large format, staring infrared focal plane arrays using substrtae material from seeded crystal growth. ($7.5M)

(U) FY 1996 Program:

- Deliver fully tested analog to digital converters, digital to analog converters, and multiplexers and demultiplexers. ($4.3M)
- Initiate prototype projects using heterojunction bipolar transistor components. ($4.3M)
- Complete transition of neural network signal processing systems to DoD platforms including installation of target tracker in Space Warfare Center. ($4.0M)
- Develop neural network target recognition algorithms for synthetic aperature radar images. ($.8M)
- Establish transitions for electronic neural network hardware boards. ($4.0M)
- Fabricate and test custom hardware for the AVIS program; develop packaging and integration strategies. ($4.6M)
- Develop first generation AVIS software (including custom compilers languages, debuggers, case tools, libraries, and environments). ($4.9M)
- Develop critical subassemblies for digital optoelectronics processor. ($3.5M)
- Develop key components of an optical backplane. ($5.0M)
- Develop packaged affordable serial output (serial or parallel data in) optoelectronic modules. ($7.0M)
- Develop packaged cost effective parallel output (parallel in, parallel out) optoelectronic modules. ($8.0M)
- Initiate development of radio frequency photonic subsystems for microwave/millimeter transmission. ($2.0M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Materials and Electronics Technology, PE 0602712E, Project MPT-02

- Develop 1.5 volt silicon on insulator (SOI) technology. ($7.0M)
- Develop circuit synthesis CAD tools. ($1.4M)
- Demonstrate self-clocking circuits. ($1.4M)

(U) FY 1997 Program:

- Develop integrated CAD tool set for high speed (>IGHz) designs. ($4.6M)
- Initiate demonstration of high speed analog to digital prototype. ($8.6M)
- Complete Advanced Vision Systems (AVIS) hardware modules and integration into heterogeneous computing systems. ($3.0M)
- Refine and complete AVIS software based on user feedback. ($4.0M)
- Demonstrate AVIS on image recognition application. ($.9M)
- Demonstrate neural network data fusion techniques in systems concept. ($8.0M)
- Demonstrate key elements of optoelectronic processor breadboard. ($2.0M)
- Demonstrate blue/green lasers with 25 hour lifetime. ($3.0M)
- Demonstrate packaged serial optoelectronic modules and identify military applications. ($6.0M)
- Demonstrate packaged parallel output (parallel in, parallel out) optoelectronic modules. ($5.9M)
- Demonstrate critical optical backplane components compatible with electronic packaging approaches. ($6.0M)
- Continue development of radio frequency (RF) photonic subsystems for microwave/millimetric wave transmission and develop millimetric wave-optical RF distribution antenna network. ($7.7M)
- Develop 0.9 volt silicon on insulator (SOI) technology. ($12.0M)
- Complete development of multi-GHz simulation tools. ($2.0M)
- Field test low power subsystem. ($2.8M)

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	94.3	88.5	62.2	81.9
Appropriated	94.3	87.1	N/A	N/A
Current Budget	94.3	92.9	62.2	76.5

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 2 Exploratory Development	R-1 ITEM NOMENCLATURE Materials and Electronics Technology, PE 0602712E, Project MPT-02

(U) **Change Summary Explanation**:

FY 1995 Increase funds a Congressional TRP earmark in nanoelectronics.
FY 1997 Decrease due to a reprioritization of DoD resources.

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Command Control Information Systems EE-21	500 *(6,733) **(3,000)	55,002 *(0) **(9,975)	61,361	38,624	50,600	74,237	81,687	99,034	Continuing	Continuing

*Speakeasy was funded in PE 0602702E, (TT-07) in FY 1994.
**IMPACT was funded in PE 0603226E (EE-27) in FY 1994 and FY 1995.

(U) **Mission Description:** Recent military operations, e.g., Desert Storm and Haiti, demonstrated that current theater command, control, communications, intelligence/information systems, planning and rehearsal systems, and non-lethal weapons capabilities lack the ability to support effective operations in diverse new arenas and scenarios ranging from desert heavy battle to urban areas with large civilian populations. Current capabilities do not provide critical interoperable wide-area communications and fail to provide real-time situational awareness, decentralized battle planning, rehearsal and execution capability, and flexible interfaces. These infrastructure shortfalls are particularly acute during early entry operations, military operations in urban areas and operations other than war when the availability of situational awareness information, planning and rehearsal capability and military communications assets are most limited and when less than lethal weapons and security measures are most needed. The programs in this project will enhance information processing, dissemination and presentation capabilities by inclusion of information concerning enemy and friendly forces (joint situational awareness picture); providing multi-media information interfaces to on-the-move users; and providing other battlefield synchronization tools.

(U) This project comprises nine programs: Command and Control Information Systems (C^2IS) (formerly Battle Command Initiative), Commercial Communications Technology Testbed (C^2T^2), multi-band, multi-mode radio (Speakeasy), satellite ground terminals (IMPACT), Military Operations in Built-up Areas (MOBA), Urban Security, Operations Other Than War (OOTW), Advanced Joint Planning ACTD and Joint Casting.

(U) C^2IS will develop battlefield interoperability, synchronization, and expansion tools and technology to support maneuver, fire support and intelligence functions in Early Entry lethality and survivability missions. Core capabilities include: information force multipliers for fire support; pre-positioned, user-tailored information; intelligent event-to-response mapping; joint and combined database synchronization; and linked rehearsal. C^2IS will develop modular software which turns Early Entry data into information and generates information force multipliers to enhance battlefield synchronization and addresses varying requirements of different echelons, e.g., timeliness and

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-21

resolution. Command and Control Information Systems (C^2IS) serves as the integrating concept and mechanism for the functional and communications capabilities being developed in Commercial Communication Technology Testbed (C^2T^2), Speakeasy and IMPACT. Examples of many interface and insertion points being explored include Army Battle Command System and Rapid Force Projection Initiative Advanced Concept Technical Demonstration (ACTD). This effort will be conducted in conjunction and Early Entry simulation and evaluation efforts performed in project EE-37, which will be incorporated in this Program Element (PE) in FY 1997 and will use the architecture analysis, data modeling and technology development results from PE 0602702E, project TT-04.

(U) C^2T^2 will extend the information processing and rehearsal capabilities developed in C^2IS, which are intended primarily for use by commanders, down to individual dismounted soldiers. C^2T^2 will focus on providing local coordination and targeting information as well as a system and a process for evaluating commercial communications products for dismounted applications through a "plug and play" interface. The system will provide dismounted soldiers with a wearable suit including heads-up and wrist-mounted displays and micro-processors to provide position/location and image transfer capabilities. Because the system will have both short and long-range communications, it will be used to evaluate multi-squad coordination, soldier interactions with remote sensors and weapons, and special situations such as air/ground data transfer for rapid-response coordinated attacks on snipers, mortars, and ambush teams. This is being performed in conjunction with the Army's Advanced Warfighting Exercise 96-02, and is expected to provide an evaluation of applicable products and improved definition of system requirements.

(U) Speakeasy is a program to develop the modules of a multi-band, multi-mode programmable digital demonstration radio capable of communicating with a wide variety of existing military and civilian radios. This will allow units to communicate across the Services and will increase rates of data transfer. This will improve data flow within and across Services and result in long-term cost savings by allowing a common tri-Service radio which is interoperable with existing systems in each of the Services. Speakeasy will interoperate with all elements of C^2IS as well as with existing legacy systems to provide enhanced connectivity, and will provide service in situations where commercial communications may be inadequate, for example, where special anti-jam or low-probability of intercept communications are needed. Relevant IMPACT technology is being inserted in Speakeasy and the programs merged in FY 1996.

(U) IMPACT, formerly in project EE-27, was a multi-disciplinary program to enhance Satellite Communication (SATCOM) support to Command and Control by leveraging advanced technology to reduce the life-cycle costs of all military satellite communications (MILSATCOM) terminals with associated reductions in size, weight, and power consumption and increased performance, reliability and capability. The program has been refocused to support Speakeasy, and

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-21

incorporated into it. IMPACT thrusts continuing under Speakeasy include: affordability (personnel cost avoidance through semi-automatic operation); interoperability (programmable radio architectures to enable simultaneous multi-mode, multi-band operations); enhanced mobility (via miniaturization) and high performance capabilities (very high data rate communications). IMPACT will provide support across the spectrum (UHF, SHF, and EHF) expanding the capabilities of Speakeasy in addition to addressing MILSATCOM.

(U) Military Operations in a Built-up Area (MOBA) will develop an integrated set of advanced technologies designed to provide timely and accurate operational awareness to significantly enhance force effectiveness in an urban environment. MOBA will enhance and supplement existing modeling and simulation tools to create a synthetic environment to address the unique suite of functional capabilities required to support activities ranging from architecture assessment to individual training whose objective is improved military operations within the urban environment. The architecture for MOBA will be utilized to provide the focus for the assessment of the contributions of technology alternatives to the enhancement of military operations in this environment.

(U) Urban Security (SECURES) will develop and demonstrate a tool which will play a key role in the efforts to ensure a safe and secure urban environment. This program will develop and demonstrate a fieldable urban environment gunshot detection sensor grid.

(U) Dual application Operations Other Than War (OOTW) will focus on the development of prototype systems for dual use (military OOTW and civilian law enforcement (LE)) applications. Example military activities include peacekeeping, counterterrorism, crowd control, noncombatant evacuation and nation building. Military OOTW missions share many common needs and characteristics with law enforcement missions, and share a common vision: protecting the lives of friendly forces as they perform their mission, minimizing collateral damage to noncombatants, and operating in a multi-cultural/multi-lingual environment. These common areas form the basis for a natural partnership among the military and law enforcement research and development (R&D) communities. This partnership has been formalized in a Memorandum of Understanding (MOU) between the Department of Defense (DoD) and the Department of Justice (DOJ) for joint technology development. A Joint Program Steering Group (JPSG) has been established under the terms of the DoD/DOJ MOU to plan and execute the R&D projects, and is chaired by ARPA. Management of the dual application OOTW projects under EE-21 will be provided through the JPSG. The ARPA focus will be on solutions that will improve our ability to conduct OOTW and LE missions through affordable, advanced technologies. Technology developments are being planned in areas such as concealed weapons detection, through the wall surveillance, geolocation, interactive simulation and training, urban mapping and visualization, telemedicine, and electrical power sources.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-21

(U) Advanced Joint Planning (AJP) ACTD will provide for the enhancement of operational capabilities by appropriate technology insertion of interoperable emerging command and control planning technologies in concert with developing concepts of operations for Battle Staff command and control with operational sponsorship of USACOM.

(U) Joint Casting will develop new casting practices which are designed to reduce the emissions of foundries in anticipation of Clean Air Act standards for volatile organic compounds and other pollutants, including benzene, formaldehyde, and hydrocarbons. The program focuses on characterization of emissions in current casting processes, core and mold making technology, metal melting treatments and handling, sand reclamation, and emissions control. The program is joint with participants from McClellan AFB, the United States Council for Automotive Research (USCAR), and California Office of Research and Technology Application (CA ORTA). The program is being administered by McClellan AFB on behalf of CA ORTA.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Investigated advanced fire detector systems and fire suppressants for metal fires. ($.25M)
- Investigated innovative methods and techniques for monitoring nuclear waste. ($.25M)

(U) FY 1995 Program:

- Command Control Information Systems (C2IS), in this PE, begins in FY 1996. ($0.0M)
- Commercial Communications Technology Testbed (C^2T^2): Conduct squad, platoon and company level demonstrations of leveraged advanced civilian personal communications and computation technology for dismounted soldiers and vehicles, in military operational training/test environment. Link situation awareness and intelligence to ground soldiers. ($9.0M)
- Speakeasy: Complete the development and integration of the advanced technology modules into the Speakeasy Advanced Development Model (ADM), Phase I; demonstrate a fully integrated ADM; award Speakeasy Phase II contract. ($7.0M)
- Military Operations in Built-up Areas (MOBA): Effort is funded in FY 1996.
- SECURES will develop and demonstrate a deployable urban environment gunshot detection sensor grid. ($2.0M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-21

- Operations Other Than War (OOTW): Thrust to date has been in the selection of specific projects to be implemented, and planning acquisition approaches for each project. Since there is no out year funding planned for this effort, all FY 1995 initiated projects are being planned to provide for a clear and useful deliverable at the conclusion of the FY 1995 funded project activity. ($20.0M)
- Advance Joint Planning (AJP) ACTD: Develop metrics for and integrate, demonstrate and install selected advanced technology planning tools in a distributed collaborative environment with the United States Atlantic Command (USACOM) operational sponsorship to support readiness, planning and crisis response. ($5.0M)
- Joint Casting: Focus to date has been on metals and processes used in the automotive industry and not the high-end alloys used primarily in aerospace (funding provided via other PEs). Beginning in mid-FY 1995 the program will begin to investigate aerospace alloy casting emissions and other DoD relevant foundry operations. ($12.0M)

(U) FY 1996 Program:

- Design and develop tailoring associates, trigger event processing and early entry automated fire support element; design projection and course of action analysis subsystems. In conjunction with Battle Labs and Rapid Force Projection Initiative Advanced Concept Technology Demonstration (RFPIACTD), evaluate component concept demonstrations with Early Entry scenarios at the operational level. Design and plan demonstration of integrated Command and Control Information Systems (C^2IS), Speakeasy and Commercial Communications Technology Testbed (C^2T^2). ($4.2M)
- Continue the development of advanced technologies for the Speakeasy multi-band, multi-mode modules and hold preliminary design review. Conduct operational concept demonstration with emphasis on full electronic reprogrammability to achieve interoperability with existing military radios. Complete integration of IMPACT technology. ($16.7M)
- Demonstrate C^2T^2 in the integrated demonstration provided by the Advanced Warfighting Experiment 96-02. Evaluate C^2T^2 impact on integrated execution of Special Operations Forces (SOF) and tactical operations for efficiency of concurrent operations and fratricide avoidance. Develop and demonstrate improved, reduced cost communication system based on emerging technologies. Link heliborne reconnaissance and mine detection to ground units for prosecution. ($7.5M)
- MOBA: Develop an integrated set of advanced technologies to provide operational awareness to enhance force effectiveness and synthetic environment to address the unique set of functionality required to support activities ranging from architecture assessment to individual training that support improved operations in

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-21

an urban environment. Finalize the formulation of an architecture for Military Operations in a Built-up Area (MOBA) to provide the focus for the assessment of the contributions of technology alternatives to the enhancement of military operations in an urban environment. ($18.0M)

- Advanced Joint Planning ACTD: Evaluate metrics of installed planning tools. Based on the results from previous installed planning tools - integrate and demonstrate additional planning tools which will result in a completed integration of planning tools at United States Atlantic Command (USACOM). Expand the funtionality of systems to crisis response; and evaluate the installed planning tools and associated metrics under operational conditions for future design incorporation. ($15.0M)

(U) FY 1997 Program:

- Command and Control Information Systems (C^2IS): Continue development of maneuver, fire support and intelligence components C^2IS technology and conduct evaluations in Brigade 97 exercises. Demonstrate integration of C^2T^2 and Speakeasy. ($13.0M)
- Speakeasy: Continue development of hardware and software technology for the Speakeasy demonstration radio and conduct critical design review. Transition technology. ($13.1M)
- Commercial Communications Technology Testbed (C^2T^2): Complete integration of C^2T^2, demonstrate improved system in a warfighting exercise, and transfer stand-alone technology. ($2.4M)
- Advanced Joint Planning ACTD: Based on the evaluation, complete the design, accomplish modifications and installation of a "leave behind" operational system, which can then be replicated for other CINCs. ($10.1M)

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	.5	24.7	61.4	38.6
Appropriated	.5	50.0	N/A	N/A
Current Budget	.5	55.0	61.4	38.6

(U) **Change Summary Explanation**:

FY 1995 Increase reflects reprogramming to initiate Advanced Joint Planning ACTD.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-21

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**:

Plan	Milestones
Apr 95	Develop metrics for Advanced Joint Planning (AJP)-ACTD.
Aug 95	Complete fabrication of joint casting research foundry.
Sep 95	Integrate, demonstrate and install selected advanced technology planning tools in a distributed collaborative environment for the AJP-ACTD.
Oct-Dec 95	Soldier testing of commercial communications system for dismounted operations and assessment of alternative missions.
Feb 96	Complete the integration of AJP-ACTD planning tools at USACOM.
Mar 96	Preliminary design review of Phase II Speakeasy system.
Jul 96	Expand the AJP-ACTD functionality of systems to crisis response.
Sep 96	Proof-of-concept demonstration of Early Entry intelligence processing tailoring associates.
Sep 96	Evaluate the installed AJP-ACTD planning tools and associated metrics under operations conditions.
Feb 97	Demonstrate novel advanced warfighting concepts using the improved commercial communications testbed.
Mar 97	Critical design review demonstration of Phase II Speakeasy.
Apr 97	Demonstrate a protoytype simulation environment capable of: representing Urban Warfare; conducting analysis of MOBA technology approaches; and evaluation of the contributions of MOBA technologies to operational effectiveness.
Sep 97	Complete the design, accomplish modifications and installation of a "Leave behind" an AJP-ACTD operational systems.
Apr 98	Demonstration of Early Entry Brigade command entity.
Mar 99	Demonstration of Early Entry force package generator.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E

COST *(In Millions)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Critical Mobile Targets (WAR BREAKER) EE-40	117,424	117,338	117,759	112,803	128,387	149,110	159,410	167,860	Continuing	Continuing

(U) **Mission Description:** Prosecution of time-critical fixed and mobile targets has long been a concern of the Services as evidenced by past efforts in the areas of Strategic Relocatable Targets and Smart Weapons. Our experience in Desert Storm has dramatically demonstrated our current inability to prosecute these targets, particularly Tactical Ballistic Missile (TBM) launchers. ARPA's WAR BREAKER program will develop advanced technology and systems to enable the detection, identification and prosecution of a wide range of high value, time-critical fixed and mobile targets including TBM launchers, mobile command posts, Mobile Air Defense Units, tanks and artillery. This project serves as the framework for maturing and integrating advanced technologies, as well as developing and demonstrating systems concepts supporting the prosecution of these targets. Key technology areas include advanced surveillance, target acquisition, advanced automatic target detection and recognition, automated intelligence correlation, battlefield management, information distribution, terrain data generation technologies, advanced high throughput sensor processing, multi-sensor fusion, data fusion, image understanding, text understanding and sensor component technologies. Of these, the Intelligence and Planning component of WAR BREAKER is comprised of: Intelligence Correlation (IC), Multiple Access Intelligence and Nomination System (MAINS), Local Attack Controller (LAC), Terrain and Feature Generation (TFG), Internetted Unattended Ground Sensors (IUGS), and TOPSIGHT.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Continued development of the WAR BREAKER analysis tool set to support Systems Engineering and Evaluation of systems performance within the Theater of Battle. Completed development of prototype baseline tool known as SimCore and started development of encapsulated SimCore Release 1. ($20.9M)
- Continued development of the Intelligence Correlation (IC) components/systems which extract, correlate, fuse and display intelligence information to determine changes in force status, order of battle and operational doctrine of time critical targets. ($13.5M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-40

- Initiated development of dynamic intelligence processor, tracking and battle management functions for the Local Attack Controller (LAC). Demonstrated initial capabilities in Army Deep Operations and Joint STARS (JSTARS) environments. ($7.5M)
- Demonstrated technology to rapidly access historical intelligence information from multiple heterogeneous databases (MAINS). Initiated development of mission nomination, distributed database and fusion technologies. Conducted User Test Assessments of Imagery Exploitation System enhancement of completeness, correctness and speed. ($8.4M)
- Initiated the design and development of the Terrain and Feature Generation (TFG) system. Developed algorithms for multi-spectral, IFSAR, optical and infrared sensor data processing for automatic feature extraction. Developed control and database structures for cartographic data fusion. ($1.6M)
- Applied advanced processing/processors to National Technical Means exploitation (TOPSIGHT). ($4.5M)
- Initiated Internetted Unattended Ground Sensors (IUGS) through awards of enabling technologies studies. ($6.0M)
- Conducted initial tests of three dimensional (3-D) Digital Terrain Elevation (DTE) Interferometric SAR (IFSAR) which includes provisions of mapping and terrain analysis data to the state of California. ($11.5M)
- Conducted Multi-Sensor Target Recognition System (MUSTRS) captive flight test on a helicopter to evaluate performace envelope limits. ($9.2M)
- Continued Automatic Target Detection/Recognition (ATD/R) technology development and assessment of potential target discriminants for prosecution of deep hide targets and initiated advanced Moving Target Indicator/Synthetic Aperture Radar (MTI/SAR) ATD/R algorithm tests. ($7.2M)
- Awarded contracts to evaluate enabling technologies to support Low Cost Synthetic Aperature Radar (SAR) production. ($10.6M)
- Analyzed and assessed the performance of algorithms in detecting manmade targets in foliage from imaging radar and Ultra-Wideband (UWB) SAR data. ($6.5M)
- Awarded contract for Gamma-Gamma resonance imaging development. ($4.9M)
- Completed current multispectral Electro-optical/Infrared (EO/IR) and low-cost focal plane array technologies efforts. ($5.1M)

(U) <u>FY 1995 Program</u>:

- Continue systems engineering analytical and distributed simulation exercises in support of the WAR BREAKER system concept. Initiate analysis and modeling plan of two nearly simultaneous Major Regional Contingencies (MRCs). Complete SimCore Release 1 framework for incorporation into analytical tool set. ($16.9M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-40

- Continue development, test, integration and demonstration of Intelligence Correlation (IC) technologies, components and systems to include a natural language processor, force/target tracker, force status assessor, and integration of two single intelligence correlators and a multiple intelligence correlator. ($17.0M)
- Continue development, test and integration of Local Attack Controller (LAC) components. Demonstrate initial integration of dynamic intelligence processor and battle management decision aids in an Air Force (CTAPS) environment. ($13.0M)
- Continue development, test and begin integration of the Multiple Access Intelligence and Nomination System (MAINS) to include demonstration of integrated query/fusion technologies and a mission nominator. ($9.5M)
- Initiate development, test and integration of the Terrain and Feature Generation (TFG) system by competitive award. Integrate technologies into TFG testbed for end-to-end evaluation, database development and user assessment. ($5.3M)
- Continue to apply advanced fusion and vision algorithms on high performance processors for National Technical Means exploitation (TOPSIGHT). Integrate search, automatic target recognition and imagery exploitation system capabilities. Complete software development and integration of the Imagery Exploitation System (IES). Conduct demonstration, test, and evaluation of the automatic processing of multiple sensors and context to detect and classify units. ($11.1M)
- Continue development and evaluation of enabling technologies for the Internetted Unattended Ground Sensors (IUGS). Examine additional technologies for performing data fusion. ($4.0M)
- Continue evaluation of technologies to provide rapid three-dimensional (3-D) digital terrain elevation data using interferometric synthetic aperture radar (IFSAR) and initiate transition to users. ($3.2M)
- Initiate development of the congressionally directed GEOSAR program utilizing low frequency IFSAR to develop terrain and potential target profiles under foliage. ($7.0M)
- Complete test and evaluation of Multi-Sensor Target Recognition System (MUSTRS) Technology. ($4.0M)
- Continue development of ATD/R technology components needed for automatic target detection, recognition, and classification, in a Moving and Stationary Target Acquisition and Recognition (MSTAR) Program; the emphasis is on a model-based reasoning approach to image analysis focused on SAR with applications to Laser radar (LADAR) and multispectral sensors as well as obtain results on the impact of alternative affordable radar sensor technology on ATR performance. ($11.3M)
- Continue 'DRAGNET' application development (which was previously a component of the low cost radar program) of Moving Target Indicator (MTI) radar and inverse synthetic aperture radar (ISAR) for detecting, recognizing and tracking high-value moving targets while they are actively moving in traffic, thus avoiding the cost of many high revisit rate SAR-imaging platforms. ($5.1M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovativ Technologies, PE 0603226E, Project EE-40

- Continue development of the 'Monitor' application demonstration for aggregating vast quantities of sensor imagery, via ATR, Interactive Target Recognition, change detection, medium/high resolution group reasoning and super-resolution in order to efficiently generate synoptic views of the battlefield, substantially reducing the cost of the human analytic infrastructure and effecting lower cost collection systems. ($5.0M)
- Continue development of the 'Clipping Service' capability to automatically screen synthetic aperature radar (SAR) imagery and crop high-information content portions of images for transmission to ground stations to reduce datalink throughput rates and avoid dramatic data communications system costs. ($1.3M)
- Continue data analysis and assessment of the performance of advanced algorithms for detecting targets in foliage from high-resolution high frequency/ultra-high frequency (HF/UHF) ultra-wideband foliage penetrating (FOPEN) Synthetic Aperture Radar (SAR) data. ($3.1M)
- Conduct a demonstration of the 'Expose' algorithm with integrated FOPEN components. ($.5M)

(U) FY 1996 Program:

- Conduct distributed simulation analysis and modeling of two nearly simultaneous Major Regional Contingencies (MRCs) incorporating current Services' capabilities along with Services' new developed systems, and ARPA's new development Surveillance & Targeting and Intelligence & Planning systems. ($15.2M)
- Continue development, test, integration and demonstration of Intelligence Correlation (IC) technologies, components, and systems. Initiate integration of the natural language processor with intelligence correlators, and the target tracker with the force status assessor. ($19.4M)
- Continue development, test and integration of Local Attack Controller (LAC) components. Demonstrate LAC prototypes in Army (Deep Operations), Air Force (CTAPS) and Airborne (JSTARS) environments. ($9.5M)
- Continue development, test and integration of the Multiple Access Intelligence and Nomination System (MAINS). Demonstrate query/fusion integration, "Cold Start" database build, distributed database and mission nomination capabilities. ($9.7M)
- Continue development, test and integration of the Terrain and Feature Generator (TFG) system for rapid processing of spatial data. Continue testbed technology insertion and evaluation. ($5.6M)
- Continue to apply advanced fusion and vision algorithms on high performance processors for National Technical Means exploitation (TOPSIGHT). Demonstrate initial integrated, cross-sensor search and automatic target recognition capabilities in a laboratory environment. ($9.8M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-40

- Demonstrate Internetted Unattended Ground Sensors (IUGS) component technologies to determine the performance gains in target classification and identification and the potential for an internetted system. ($5.2M)
- Continue development of 'Moving and Stationary Target Acquisition and Recognition' (MSTAR) infrastructure and baseline algorithm suite for an increased number of targets modeled and hide states. ($17.7M)
- Complete algorithm development and hardware modifications for 'Dragnet' moving target classification application demonstration. ($6.6M)
- Continue developing 'Monitor' application baseline configuration, including developing a testbed in cooperation with the ARPA Intelligence and Planning program. ($7.0M)
- Continue development of 'Clipping Service' application in cooperation with the DARO and the High Altitude Endurance (HAE) Unmanned Aerial Vehicle (UAV) program. ($2.6M)
- Initiate detailed tradeoffs on ATR performance as a function of candidate common components for a low-cost radar product line under the Affordable Radar Program. ($2.0M)
- Continue assessment of 'Expose' capabilities consistent with Foliage Penetration (FOPEN) objective and complete characterization of FOPEN environment and predicted system performance. ($4.1M)
- Transition extant Laser Radar (LADAR) ATR and multi-spectral technology to augment shallow and deep hide target detection/recognition to serve as an auxilliary sensor. ($3.4M)

(U) FY 1997 Program:

- Continue to conduct distributed simulation analysis and modeling of two nearly simultanious Major Regional Contingencies with current Services' capabilities, Services' new developed systems, and ARPA's new development Surveillance & Targeting and Intelligence & Planning systems. ($13.3M)
- Continue to develop, test, integrate and demonstrate Intelligence Correlation (IC) technologies, components, and systems. Demonstrate an initial fully integrated and functional prototype in a laboratory environment. ($19.0M)
- Continue development, test and integration of Local Attack Controller (LAC) components and integrated prototypes. Integrate distributed database technologies from MAINS. Demonstrate initial integrated functional prototypes in multiple heterogeneous operational environments. ($8.1M)
- Continue development, test and integration of the Multiple Access Intelligence and Nomination System (MAINS). Demonstrate an initial integrated prototype in an operational environment. ($9.5M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-40

- Continue development, test, and integration of the Terrain and Feature Generator (TFG) system. Demonstrate an integrated initial prototype in an operational environment. ($5.0M)
- Continue to apply advanced fusion and vision algorithms on high performance processors for National Technical Means exploitation (TOPSIGHT). Demonstrate advanced integrated, cross-sensor search and automatic target recognition capabilities in a laboratory environment. ($9.5M)
- Transition IUGs technology to Rapid Force Projection Initiative Advanced Concept Technology Demonstration (ACTD) and underground ACTD. ($1.0M)
- Demonstrate 'Moving and Stationary Target Acquisition and Recognition' (MSTAR) development infrastructure and baseline algorithm suite for a set of 20 targets and transition components. ($19.0M)
- Demonstrate 'Dragnet' application as part of broad cost avoidance strategy for wide-area radar surveillance systems. ($5.2M)
- Transition and assess the performance of a 'Monitor' prototype workstation in cooperation with the ARPA I&P program. ($8.9M)
- Demonstrate 'Clipping Service' system for real-time screening Synthetic Aperature Radar(SAR) imagery. ($4.0M)
- Assess and select designs for common components of an Affordable Radar. Initiate experimentation contracts. ($3.5M)
- Demonstrate the 'Expose' application for Foliage Penetration (FOPEN) in an integrated airborne system. ($2.1M)
- Transition MSTAR (ATD/R) results to initiate laboratory development of an 'Auxiliary Sensor' capability utilizing passive and/or active multispectral and Laser Radar (LADAR) sensors. ($4.7M)

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	117.2	132.9	117.8	112.8
Appropriated	117.2	118.2	N/A	N/A
Current Budget	117.4	117.3	117.8	112.8

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Experimental Evaluation of Major Innovative Technologies, PE 0603226E, Project EE-40

(U) **Change Summary Explanation**:

FY 1994–95 Adjustments reflect minor programming pricing.

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**:

Plan	Milestones
Jun 94	Completed first phase of Multi-sensor Target Recognition System (MUSTRS) flight experiment (Helicopter).
Sep 94	Installation of SIGINT correlator prototype at operational site. (Intelligence Correlation)
Feb 95	Demonstration of Tracker 2.0 with multiple targets, diverse observation types and variable terrain. (Intelligence Correlation)
May 95	Test and evaluation of Intelligence and Planning components at Roving Sands exercise.
Aug 95	Proof of concept demonstration of integration of Intelligence and Planning components.
Sep 95	Initial demonstration of automatic cue development from contextual analysis of Moving Target Indicator (MTI) radar data. (Local Attack Controller)
Nov 95	Demonstrate automapping capability using interferometric Synthetic Aperture Radar (IFSAR).
Jun 96	Complete SIMCOR simulation analysis tool.
Aug 96	Realtime demonstration, using infrared, of Forces Wide Area Search Component of TOPSIGHT.
Sep 96	Integrated Tracker-Kinematic Intelligence Processor demonstration for Army-USMC Battle Management. (Local Attack Controller)
Mar 97	Demonstration of distributed, cooperative Battle Damage Assessment. (Multiple Access Intelligence and Nomination System)
Apr 97	Demonstrate technology to build and distribute over a wide area network, terrain, feature, intelligence, and object data for a 1 million square KM theater.
Nov 97	Demonstrate integrated intelligence correlation and battle management to perform local attack control.
Aug 98	Demonstration of all service, distributed, collaborative Local Attack Control.
Sep 98	Terrain and Feature Generation operational prototype.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Defense Reinvestment, PE 0603570E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Defense Reinvestment	495,502	443,196	500,000	0	0	0	0	0	0	2,000,331

(U) **Mission Description:** The purpose of the Defense Reinvestment program is to enhance the technological superiority and affordability of U.S. military technology through dual-use projects designed to directly improve military capabilities while also having potential pay-offs in the commercial sector. Key to meeting the program objectives is the selection of particular technology areas which can serve both a military and a commercial market, thereby encouraging a partnership and cost sharing between commercial industry and the Department of Defense. Manufacturing and technology assistance to the manufacturing firms critical to Defense acquisition, and education and training programs designed to enhance U.S. manufacturing skills and target displaced defense industry workers have also been a part of this program; future emphasis will be mainly on technology development.

Defense Dual-Use Critical Technology Partnerships
Commercial-Military Integration Partnerships
Defense Advanced Manufacturing Technology Partnerships
Manufacturing Engineering Education Grant Program
Regional Technology Alliances
Small Business Innovation Research

(U) The initial competition held in FY 1993/1994 resulted in the selection of 212 proposed partnerships. Lessons learned from this competition were shared with potential future partners through nationwide multi-city outreach seminars. These lessons are analyzed and applied, as appropriate, to enhance the program each year.

(U) The FY 1995 program is soliciting proposals in a general competition with emphasis on developing dual-use technologies. Changes in authorization language will be implemented to provide additional assistance for small businesses. Manufacturing Education and Training and Regional Technology Alliances will remain a part of the program. No manufacturing extension program will be part of this competition.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Defense Reinvestment, PE 0603570E

(U) The FY 1996 programs will continue to develop and deploy promising new technologies with competitions planned for each year. The majority of the initial partnerships will have concluded their first phase by this time and studies will be initiated to analyze the success/results of these first efforts. At a minimum, the studies will search for strengths/weaknesses of each partnership and an overall assessment on the progress of the program.

(U) Funding for the Small Business Innovation Research (SBIR) Program is included within this Program Element to strengthen the role of small business in meeting dual-use research and development for both military and commercial applications.

(U) The program will be refocussed commencing in FY 1997 toward military systems and is budgeted in a new PE 0603805E.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Funded highly successful proposals identified as part of the FY 1993 solicitation. ($140.0M)
- Funded on-going manufacturing efforts such as the Agile Manufacturing program and the SBIR program. ($99.0M)
- Completed the selection process and identified new partnerships for a focused technology competition concentrating on 7 technology areas and deployment components. ($150.0M)
- Announced an open, general solicitation to be conducted in early to mid FY 1995. This competition will use remaining FY 1994 funds ($85.0M) as well as those appropriated in FY 1995.

(U) FY 1995 Program:

- Sign agreements with partners selected under focused competition.
- Conduct out-reach seminars to assist potential partners in responding to general competition announced in FY 1994.
- Execute FY 1995 options on successful partnerships begun in FY 1993 and FY 1994.
- Select and establish new partnerships resulting from the general competition announced in late FY 1994.
- Sign agreements with partners selected under the general competition.

(U) FY 1996 Program:

- Initiate the FY 1996 competition.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Defense Reinvestment, PE 0603570E

- Execute FY 1996 options on partnerships begun in FY 1995 and prior.
- Conduct additional out-reach seminars to discuss lessons learned from previous competitions.
- Complete selection process and identify new partnerships.
- Conduct formal assessment of FY 1993 program results.
- Sign agreements with partners selected under the FY 1996 competition.

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	474.0	625.0	500.0	400.0
Appropriated	474.0	548.2	N/A	N/A
Current Budget	495.5	443.2	500.0	0

(U) **Change Summary Explanation**:

FY 1994 Increase due to prior approved reprogramming action.

FY 1995 Reduction due to reprogramming of the Advanced Materials Partnerships program ($25.0M) to PE 0602712E; Agile Manufacturing ($30.0M) and the U.S. – Japan Management Training program ($10.0M) to PE 0603739E; and the MARITECH program ($40.0M) to PE 0603746E.

FY 1996 Adjustments made to satisfy internal DoD budget priorities and effect the transfer of the Advanced Materials Partnerships, Agile Manufacturing, U.S. - Japan Management Training, and MARITECH programs to more appropriate program elements.

(U) FY 1997 Program refocussed and transferred to PE 0603805E.

(U) **Other Program Funding Summary Cost**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Defense Reinvestment, PE 0603570E

(U) **Schedule Profile**:

Plan	Milestones
1st Qtr FY 95	Sign agreements with partners selected under focused competition.
3rd Qtr FY 95	Select and establish new partnerships identified during the general competition announced in late FY 1994.
1st Qtr FY 96	Initiate the FY 1996 competition.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PF 0603739E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Electronics Fabrication (Dual Use Applications) MT-01	0	0	1,907	50,000	50,000	50,000	50,000	50,000	Continuing	Continuing

(U) **Mission Description:** Highly integrated electronic systems are the foundation for nearly every system being planned and developed to meet the future needs of the DoD for autonomous weapons and surveillance systems to support rapidly deployable responses to global situations at all conflict levels. DoD played a creative role as the first customer for microelectronics in the guidance package for Minuteman II. Today the leading-edge of digital integrated systems technology has shifted from being driven by the high performance, high reliability, but low volume demands of the DoD to being driven by low cost, high volume commercial applications. Military systems for the future demand electronics technologies which permit the seamless integration of functions such as light emitters and detectors, RF/Microwave sources and detectors, microelectromechanical devices and sensors along with the silicon digital integrated circuit. Once again, DoD can play a creative role by being the first user of technologies that offer orders-of-magnitude improvements beyond commercial practices in performance, cost and system compactness. This project will design, develop, fabricate, package, and demonstrate in system feasibility verification experiments those technologies that are necessary for the DoD to cost-effectively produce leading-edge technologies at affordable costs in low volume fabrication to arm the warfighters of the 21st Century. The Department will conduct these pathfinder experiments in such a way that the technologies can be easily exploited by the commercial industry, allowing the military both first use and lowest cost.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments: N/A

(U) FY 1995 Program: N/A

(U) FY 1996 Program:

- Initiate effort to develop advanced design and process technologies for highly integrated electronics that can meet DoD performance and cost requirements. ($1.9M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-01

(U) FY 1997 Program:

- Continue development of techniques capable of achieving multifunction system level integration. ($8.1M)
- Initiate the development of device and design tools for multifunction system level integration. ($5.0M)
- Initiate development of high yield, low cost and robust processes for system integration of dissimilar and advanced materials. ($19.7M)
- Development of design, analysis and fabrication tools for DoD electronics applications. ($12.6M)
- Start assessment and development of integrated systems targeted to military systems with high impact to information processing applications. Potential applications include smart sensor and activator-processors, smart input/output for processor/memory, and smart display/processors. ($4.6M)

(U) FY 1998 Program:

- Initiate efforts in new equipment capabilities and associated fabrication technologies to enable cost-effective, high yield fabrication of electronic components and modules for DoD systems that can pioneer uses in the commercial marketplace ($26M).
- Begin development of new dielectric and interconnect metallization materials and processes to allow higher bandwidths and signal densities with tighter noise margins. ($15M)
- Initiate projects to enable verification of circuit functionality ($2M)
- Initiate new approaches to processing to allow greater integration of functionality and also increase manufacturing flexibility. ($7M)

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	0	0	1.9	26.5
Appropriated	0	0	N/A	N/A
Current Budget	0	0	1.9	50.0

(U) **Change Summary Explanation**:

FY 1997 Increased to support the development of manufacturing tools for military use of cost effective components for DoD specific applications that also have commercial utility.

(U) **Other Program Funding Summary Cost**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-01

(U) **Schedule Profile**:

Plan	Milestones
Jun 96	Issue BAA to solicit proposals on multifunctional integration strategies which would enable military systems to be fabricated.
Dec 96	Issue BAA to initiate the development of process and design tools for dense multifunction system level integration.
Sep 97	Complete materials properties investigations and transfer results to suppliers.
Sep 97	Demonstrate ultra-clean process technologies compatible with standard fabrication practices for high yield fabrication of military electronics.
Sep 97	Release core modules of alpha-version software tools for design and verification of ultra-large-scale circuits.
Sep 97	Complete design of experiments plans for low dielectric constant, low resistivity, low inductance interconnect technologies.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E

COST *(In Millions)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Centers of Excellence MT-07	23,837	38,377	23,642	0	0	0	0	0	0	113,520

(U) **Mission Description:** This project provides funding for Centers of Excellence including the Robert C. Byrd Institute for Advanced Manufacturing at Marshall University and the Focus: Hope National Center for Advanced Technologies (NCAT). The purpose of these Centers is to demonstrate, deploy and provide advanced manufacturing technology to significantly reduce unit production and life cycle costs, improve product quality, and deploy manufacturing training systems.

(U) The Institute for Advanced Flexible Manufacturing provides both a teaching factory and initiatives to local area industries to utilize computer-integrated manufacturing technologies and managerial techniques to improve productivity and competitiveness. The National Center for Advanced Technology (NCAT) is a component of the Focus: Hope Project whose purpose is to train technicians/engineers in advanced manufacturing processes and methods, demonstrate state-of-the-art flexible manufacturing and serve as a testbed for emerging manufacturing research.

(U) This project also includes funding for the U.S.-Japan Management Training Program whose purpose is to build a growing infrastructure of American scientists and engineers with knowledge about the Japanese R&D enterprise and providing training in the Japanese language.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Developed contracts, determined manufacturing requirements, purchased the install manufacturing equipment and entered production for the 4th through 7th of the eleven planned manufacturing neighborhoods at National Center for Advanced Technologies (NCAT) increasing overall defense production rates to 10,000 parts per month. ($19.8M)
- Institute for Advanced Flexible Manufacturing. Continued the ongoing technology development, technology evaluation and technology transfer to local business. Provided system integration, supported CALS commercialization, client assistance for federal contracts, technology training through seminars and workshops, and research into dual-use flexible manufacturing. ($4.0M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-07

(U) FY 1995 Program:

- Complete the installation of the planned manufacturing neighborhoods at NCAT. ($14.4M)
- Continue the on-going technology development at Institute for Advanced Flexible Manufacturing which includes technology evaluation, research into dual-use flexible manufacturing and technology transfer to local business. ($4.0M)
- Establish a Regional Consortium for Advanced Education and Training Technologies which will provide for the development of computer software education and training technologies required to further adult training in advanced technology jobs critical to the defense industry. It will also focus on the retraining of defense personnel for industry jobs. ($10.0M)
- Create eleven centers of excellence to support students, researchers, and executives to understand Japan's manufacturing infrastructure, culture and language. ($10.0M)

(U) FY 1996 Program:

- Develop, demonstrate and evaluate new technologies for insertion and transfer to manufacturing centers and industry, with a focus on small to medium manufacturing companies. ($7.0M)
- Develop software to integrate 3D computer model with numerically controlled machine tools, and demonstrate its production capability. ($4.0M)
- Demonstrate an electronic (digital) library in the context of education and training of machinists. ($3.0M)
- Continue to support the centers of excellence to train students and professionals to understand Japan's manufacturing infrastructure, culture and language. ($9.6M)
- Program completed

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	23.8	15.0	23.6	19.9
Appropriated	23.8	19.0	N/A	N/A
Current Budget	23.8	38.4	23.6	0

(U) **Change Summary Explanation**:

Projects are completed in FY 1996.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-07

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**:

Plan	Milestones
Sep 94	Completed installation of the 4th through 7th manufacturing neighborhoods.
Sep 95	Complete installation of the manufacturing neighborhoods.
	Complete Center for Computing Excellence at the Greater Philadelphia Consortium.
Sep 96	Develop, demonstrate and evaluate technology insertion and technology transferred to medium and small manufacturing companies.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E

COST (In Thousands)	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Manufacturing Technology Applications MT-08	7,186	54,738	78,942	76,248	57,405	35,000	35,000	40,000	Continuing	Continuing

(U) **Mission Description:** Future military systems will be affordable only if the manufacturing process is considered as an integral part of product design, production takes place in flexible, multi-product factories, and if advanced manufacturing technology is combined effectively with advanced business practices. This program focuses on demonstrations of process technology combined with innovative industrial practices, and will measure the improvements in cost, schedule and quality achievable in key defense product areas. Three major initiatives are included in the FY 1995-1998 program: Affordable Multi-Missile Manufacturing (AM3); and Agile Manufacturing Pilot Programs; and Interferometric Fiber Optic Gyroscopes (IFOG).

(U) The Affordable Multi-Missile Manufacturing (AM3) program is an Advanced Technology Demonstration initiated in FY 1995. The AM3 objective is to demonstrate the feasibility of 25-50% reductions in the unit cost of tactical missiles, both in ongoing missile production programs and in new missiles and major modifications. This will be accomplished by teams of missile prime contractors, component suppliers and manufacturing equipment and software vendors who develop and demonstrate the combined effects of advanced manufacturing and assembly systems and processes, missile value engineering changes, and acquisition reform and business practice innovations. A major technical theme is to achieve economies across a mix of missiles to compensate for the decline in individual missile quantities. Demonstrations will be conducted in the design and manufacture of components and guidance and control/seeker assemblies for multiple missiles, including R&D and production programs. Phase 1 (FY95-96) is detailed design of the factories and enterprise processes and missile design concepts, in several parallel contracts. Phase 2 (FY96-97) is demonstration in component level manufacturing. Phase 3 is downselection to two pilot manufacturing enterprises, cost shared implementation of concepts, and missile-level demonstrations. DoD missile program managers will be involved throughout the AM3 program so that successful results can be rapidly inserted to reduce the cost of DoD's portfolio of tactical missiles.

(U) Agile Manufacturing is an industry-developed vision for 21st century manufacturing, which focuses on the ability to thrive in an environment of changing product technologies, customer demands, and development and production team members. This new paradigm is ideally suited to the needs of defense manufacturing in the future. Agile Manufacturing Pilot Programs are structured to evaluate the manufacturing enterprise concepts and enabling

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-08

technology required for agility on and above the factory floor. Since over 50% of the cost of weapon systems is attributable to components from lower tier suppliers, the major emphasis is on tightly integrating the supplier chain and other elements of the manufacturing enterprise. Pilot programs include enabling technology demonstrations, which focus on networks, decision support and enterprise command and control; advanced business practice demonstrations, which focus on the ability to form instant partnerships, link core competencies, and respond rapidly to customer needs; and integrated pilots, which are cost shared demonstrations which combine flexible shop floor and enterprise level technologies with advanced practices t demonstrate new benchmarks for cost, time and quality in key product areas of importance to DoD. Continued refinement of Agile Manufacturing concepts, integration of demonstration results, and dissemination to a broad industry community is accomplished through a cost-shared Agile Manufacturing Industry Forum.

(U) Interferometric Fiber Optic Gyroscopes (IFOG) are emerging as preferred technology for future commercial inertial navigation applications. The IFOG Manufacturability Program emphasis will be on achieving the design and manufacturing flexibility required to make low volume Defense access to high volume commercial production economically viable. This program will develop the large throughput robotic assembly, packaging and testing technologies necessary to fabricate miniature navigation-grade (1 nm/hr) IFOG inertial measurement units (IMUs) at less than $1,500 per axis as a goal. Miniature navigation-grade IMUs are essential to precision strike weapon systems required to accurately navigate through extended periods of Global Positioning System (GPS) outage due to enemy jamming. Example technology development areas include: (1) low loss, low reflectivity, polarization-preserving optical connectors between optical fiber subassemblies, and optical sources, detectors and miniature integrated optical circuits (MIOCs); (2) rapid, precision coil winding machines; (3) geometrically stable, environmentally robust (temperature and vibration) packaging of critical optical subassemblies; (4) large volume MIOC foundry processes; and (5) automatic testing machines. Phase 1 will identify IFOG manufacturing process requirements for components, subassemblies and complete IFOG units. Phase 2 will demonstrate advanced manufacturing methods and equipment for environmentally robust, optically stable IFOG component and subassembly packaging facilities; for rapid, precision coil winding machinery; for large batch processing Multifunction Integrated Optical Circuit foundry; and for automatic test equipment. Refined manufacturing processes and controls for complete brassboard IFOG units will be implemented. Phase 3 establishes and demonstrates a prototype automated, flexible IFOG manufacturing facility, transitioning the manufacturing processes and control from Phase 2. This flexible production line will produce navigation grade (0.01 degree/hr) and tactical grade (0.1 - 1 degree/hr) IFOGs for military uses, as well as lower performing (> degree/hr), lower cost IFOGs for commercial use.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739F, Project MT-08

(U) **Program Accomplishments and Plans**:

(U) FY 1994 Accomplishments:

- Demonstrated a networked infrastructure linking computer-aided design, engineering, and analysis with manufacturing systems. ($7.2M)
- Completed source selection for an industry forum activity to continue development and refinement of the Agile Manufacturing vision (joint program with National Science Foundation).

(U) FY 1995 Program:

- Competitive awards for Phase 1 of AM3. Began detailed functional design of the multi-missile enterprise, including definition of enabling tools and technology to be demonstrated in Phase 2, layout of the factories, definition of key organization interfaces and business practice improvements, and definition of proposed changes in missile design. ($11.4M)
- Initiated AM3 cost analysis and benefits measurement process, including predicted metrics for the enterprise, comparison to relevant benchmarks from military and commercial firms, assessment of impact on the target missile mix, and development of the validation plan for Phases 2 and 3. ($2.2M)
- Competitive awards for Agile Manufacturing Enabling Technology Demonstrations of decision support, enterprise command and control, and flexible shop floor control. ($7.0M)
- Competitive awards for Agile Manufacturing Advanced Business Process Demonstrations of activity based cost systems, agile workforce management systems, supplier chain management integration, and contracting approaches for instant partnerships. ($7.0M)
- Competitive awards for Agile Manufacturing Pilot Programs and enterprise level demonstrations of technology and business practices in space launch vehicle manufacturing and in supplier chains for large metal castings. ($10.0M)
- Continue Agile Manufacturing industry forum activities to develop technical underpinnings and supporting data for agility concepts, education and tech transfer, and integration of demonstration results into an agility tool kit. ($6.0M)
- Defined advanced manufacturing processes for Interferometric Fiber Optic Gyroscopes (IFOG) components and subassemblies. ($5.2M)
- Defined advanced architectures and manufacturing processes for IFOG units. ($5.3M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-08

(U) FY 1996 Program:

- Complete AM3 Phase 1, approve validation plans, and initiate Phase 2 demonstrations to assess and mitigate risks, including simulation and modeling, design and component-level manufacturing demonstrations, and qualification testing. ($15.7M)
- Competitive awards to research labs, universities and manufacturing system vendors for development of technology to fill gaps identified in AM3 Phase 1. ($10.3M)
- Continue AM3 technical integration activities, conduct independent evaluation of contract cost/savings analyses, and complete initial set of benchmark comparison studies for the missile sector ($2.7M)
- Complete Agile Manufacturing business practice demonstrations and documentation, insert results in Pilot Program testbeds, and disseminate results for DoD and industry implementation. ($5.0M)
- Complete Agile Manufacturing enabling technology demonstrations, initiate beta test in Pilot Programs, and transfer technology through the Industry Forum and through vendor products. ($5.0M)
- Continue Agile Manufacturing pilots in space launch vehicles and castings, and competitively award additional pilot in electronics manufacturing. ($13.0M)
- Continue Agile Manufacturing industry forum activities, including delivery of first version of agility toolkit. ($5.0M)
- Develop and implement manufacturing processes for coil winding and optical components/subassemblies. ($8.3M)
- Complete Interferometric Fiber Optic Gyroscopes (IFOG) architectures and begin to develop and implement manufacturing processes. ($12.5M)

(U) FY 1997 Program:

- Complete AM3 Phase 2 component-level validation demonstrations. ($6.2M)
- Downselect to two pilot enterprises for AM3 Phase 3, and initiate cost-shared implementation and demonstration of concepts and technology across the target missile mix. ($16.3M)
- Complete initial demonstrations of technologies to fill gaps identified in AM3 Phase 1, expand benchmarking studies, and continue technical integration and independent cost analysis. ($7.5M)
- Complete Agile Manufacturing pilots in space launch vehicles and metal castings, transfer results through the Industry Forum and through vendor products and network services. ($18.9M)
- Continue Agile Manufacturing pilot program in electronics and initiate a pilot in aircraft or engine manufacturing. ($15.0M)
- Complete Agile Manufacturing industry forum activities, transition to self-sustainment that does not require DoD funding. ($5.0M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-08

- Evaluate wind coils and packaged subassemblies. ($5.4M)
- Continue to implement brassboard IFOG unit manufacturing processes. ($12.4M)
- Initiate Phase 3 (e.g., procure long-lead items). ($4.5M)

(U) **Program Change Summary:** *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	6.7	39.5	73.9	91.2
Appropriated	6.7	24.5	N/A	N/A
Current Budget	7.2	54.7	78.9	76.2

(U) **Change Summary Explanation:**

FY 1994 Increase reflects minor repricing.
FY 1995-96 Increase due to transfer of Agile Manufacturing into this program element.
FY 1997 Decrease reflects termination of the Agile Manufacturing effort.

(U) **Other Program Funding Summary Cost:** N/A

(U) **Schedule Profile:**

Plan	Milestones
Apr 95	Initiate Agile Manufacturing technology, business practice, and integrated pilot contracts.
May 95	Award Interferometric Fiber Optic Gyroscope (IFOG) manufacturability contracts.
Jun 95	Initiate AM3 Phase 1 contracts.
Jan 96	Define processes for assembling IFOG optical components (e.g. sources, detectors).
Feb 96	Establish IFOG unit architectures and baseline configurations.
Mar 96	Complete IFOG investigations of designs and methods for coil winding.
Apr 96	Approve validation plans and initiate AM3 Phase 2 contracts.
Sep 96	Complete Agile Manufacturing enabling technology and business practice demos.
Apr 97	Complete IFOG advanced coil winding machinery.
Jul 97	Demonstrate winding of coils with advanced coil winding machinery.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-08

Jul 97	Complete AM3 Phase 2 demos, downselect to two contractors for Phase 3.
Aug 97	Demonstrate packaging of IFOG optical subassemblies.
Sep 97	Complete initial integrated pilots and transition Industry Forum to self-sustainment.
Nov 97	Demonstrate assembly of brassboard IFOG units.
Dec 99	Complete AM3 Phase 3 multi-missile manufacturing demos.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Advanced Lithography MT-10	57,931	57,731	39,003	51,404	55,300	50,000	45,000	45,000	Continuing	Continuing

(U) **Mission Description:** Lithography technology has enabled the dramatic growth of integrated circuit (IC) capability over the past two decades. Advances in lithography are required to increase the speed and reliability of electronic and computing systems while decreasing their cost, power consumption and weight. Advanced microelectronics technology is essential for computing, data and signal processing, and communications in military systems, such as smart weapons, radar, electronic warfare, sensing, communications, command and control, and surveillance. Further improvements in areas such as target recognition, autonomous guided missiles and beam forming for sonar and radar require microcircuits with smaller features in order to meet the operational speed, power, weight and volume constraints of these systems.

(U) Current microelectronics fabrication utilizes 0.35 micron minimum feature sizes. This effort develops subsystems and systems to establish lithographic capability below 0.2 microns for late 1990s military systems. Because different lithography approaches will be used in future generations of semiconductor technology, this effort balances investment in competing approaches with a strong emphasis on the common cross-cutting techniques that will be required. Key developments include mask technology (electron-beam tools for pattern writing, mask fabrication demonstration, mask repair tools, and membranes), improved alignment and overlay techniques, metrology, systems development and integration utilizing various radiation sources (x-ray, electron-beam, ion-beam, and optics), and device demonstrations to establish viability of the developed systems.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Improved cross-cutting technologies (mask, alignment) leading to 0.18 micron design rules, including demonstration of a 50KV e-beam mask writer. ($24.0M)
- Initiated efforts to migrate the 0.25 micron aligners to 0.18 micron capability. ($6.0M)
- Continued efforts in ion-beam, electron-beam, and advanced optical lithography, including characterization of the 193-nanometer exposure system. ($7.0M)
- Demonstrated 0.25 micron logic device fabrication with proximity x-ray and demonstrated pattern definition with improved projection x-ray system. ($15.9M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-10

- Extended x-ray technology into other applications such as coronary applications. ($5.0M)

(U) FY 1995 Program:

- Develop mask technology including masks with feature sizes at 0.25 and 0.18 micron for proximity x-ray systems. ($20.0M)
- Develop exposure systems and processes for proximity x-ray systems. ($23.0M)
- Initiate program to develop mechanical alignment systems for deep ultra-violet exposure systems. ($7.7M)
- Demonstrate subsystems for 0.18 micron tools in ion-beam and electron-beam exposure systems. ($7.0M)

(U) FY 1996 Program:

- Deliver 0.18 micron feature size x-ray and 0.25 micron phase shift optical masks from mask shop. ($15.0M)
- Demonstrate prototype projection electron-beam and ion-beam lithography lenses. ($8.0M)
- Demonstrate processing using x-ray lithography for 0.25 and 0.18 micron. ($5.0M)
- Develop alignment sub-assemblies and sources for 0.12 micron lithography system. ($8.0M)
- Improve output of x-ray point sources. ($3.0M)

(U) FY 1997 Program:

- Demonstrate stage control for lithography tools with 0.12 micron capability. ($4.0M)
- Fabricate devices using soft x-ray reduction techniques. ($3.0M)
- Demonstrate breadboard (alpha) versions of an electron-beam or ion-beam projection lithography system. ($13.0M)
- Fabricate masks and devices with .18 micron design rules. ($8.0M)
- Initiate design and build of 0.12 stepper. ($10.0M)
- Improve e-beam writing, inspect, repair, and processing for 0.12 mask capability. ($13.4M)

(U) **Program Change Summary:** *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	58.4	10.0	39.0	61.4
Appropriated	58.4	57.7	N/A	N/A
Current Budget	57.9	57.7	39.0	51.4

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-10

(U) **Change Summary Explanation:**

FY 1994 Reduction due to minor program repricing.
FY 1997 Decrease due to reprioritization of DoD resources.

(U) **Other Program Funding Summary Cost:** N/A

(U) **Schedule Profile:**

Plan	Milestones
Dec 95	Demonstrate a "nanowriter" electron-beam tool for writing features at 50 nanometers.
Mar 96	Deliver prototype x-ray masks with 0.18 µm features.
Jun 96	Demonstrate mask repair tool for masks with 0.15 micron features.
Jul 96	Demonstrate source for Extreme Ultra Violet (EUV) (13.5 nm) lithography.
Sep 96	Fabricate devices with 0.18 micron features.
Dec 96	Demonstrate x-ray source suitable for x-ray prototype tool for 0.18 µm features.
Jan 97	Deliver mask writer for writing 0.18 µm features.
Mar 97	Demonstrate stage control to 10 nm, suitable for 0.12 micron lithography tools.
Apr 97	Demonstrate breadboard (alpha) version of electron-beam lithography system.
Sep 97	Fabricate devices using EUV lithography.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
CALS / Electronic Commerce Resource Centers MT-11	43,000	38,340	34,247	10,604	0	0	0	0	0	126,191

(U) **Mission Description:** The mission of this program is the transfer of electronic commerce (EC) technologies to small- and medium-size enterprises (SMEs) through a network of regional deployment centers. This mission is a subset of the overall DoD plans for Continuous Acquisition and Life-cycle Support (CALS) and for electronic commerce as part of Acquisition Reform. To reflect the focus on that subset, the program name was changed in CY 1994 from CALS Shared Resource Centers to Electronic Commerce Resource Centers (ECRCs). In transferring EC technologies to SME's, the ECRC technical vision is that manufacturing companies will move down a path of increasing EC capability that ranges from linking suppliers with customers, via electronic data interchange, to the establishment of virtual enterprises. An ECRC technology hub has been established to keep abreast of EC technologies and to ensure that technical consultants in the regional ECRCs are equipped with the latest information and training on EC technologies.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Cognizance for the CALS Shared Resource Centers (CSRC) program transferred from Air Force to ARPA. ($1.0M)
- Established agreements for continuation of existing centers. ($24.0M)
- Established three new Regional Satellites. ($9.0M)
- Established technology development hub. ($9.0M)

(U) FY 1995 Program:

- Reestablish Orange, TX ECRC under management of non-profit or educational institution (Congressional direction). ($2.0M)
- Continue Regional ECRC activities; expand the depth of specialized ECRC expertise through technology demonstration projects; establish and execute a plan for support of the DoD Electronic Commerce in Contracting initiative; convene a series of DoD Prime/supplier chain forums and follow up with small- and medium-size suppliers to implement electronic commerce transaction capabilities. ($23.3M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Exploratory Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-11

- Conduct technology hub operations with initiatives for Electronic Commerce Testbed and for advances in tools needed for development of Standard for Exchange of Product Data (STEP) application protocols. ($7.0M)
- Competitive awards to Electronics Commerce Resource Centers (ECRC)/university/business teams for near-term innovations in electronics commerce practices. ($6.0M)

(U) FY 1996 Program:

- Competitive award for an integrated ECRC network of sites for nationwide delivery of education, training, and technical support services. ($22.2M)
- Continue Technology Hub operations with initiatives for Electronic Commerce Testbed, and for advances in tools needed for development of STEP applications. ($6.0M)
- Complete ECRC/university/business demonstrations of near-term innovations in electronics commerce practices. ($6.0M)

(U) FY 1997 Program:

- Continue Technology Hub functions under contractor winning full and open competition. ($3.0M)
- Operate network of ECRCs under management of team winning competition; provide education, training, and technical support to SMEs in the supplier chains of DoD and DoD primes. ($7.6M)

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	43.0	40.0	34.2	20.6
Appropriated	43.0	38.3	N/A	N/A
Current Budget	43.0	38.3	34.2	10.6

(U) **Change Summary Explanation**:

FY 1997 Decrease reflects repricing.

(U) **Other Program Funding Summary Cost**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Exploratory Development	R-1 ITEM NOMENCLATURE Advanced Electronics Technologies, PE 0603739E, Project MT-11

(U) **Schedule Profile**:

Plan	Milestones
Feb 94	Transferred CALS Shared Resource Centers (CSRC) program from Air Force to ARPA.
Jun 94	Established agreements for continuation of existing centers.
Sep 94	Established three new CSRC Regional Satellites.
Sep 95	Complete initial demonstrations, show feasibility of non-Federal cost share.
Sep 96	Demonstrate value of networked access to ECRC services; implement mechanisms for non-Federal cost sharing.
Sep 97	Transition Electronic commerence Resources Centers (ECRC) retail deployment activities to manufacturing extension program beyond RDT&E.
Sep 98	Transition ECRC activities to manufacturing extension program beyond RDT&E.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Simulation, National Guard PE 0603744E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Advanced Simulation (National Guard) SM-01	27,107	29,537	5,799	0	0	0	0	0	0	90,900

(U) **Mission Description**: In FY 1992, Congress appropriated funds to initiate a program to apply advanced technology to the training of National Guard Roundout Brigades. This program was initiated to respond to issues that developed in the 1991 Desert Shield/Desert Storm mobilization and is now a part of the Synthetic Theater of War Advanced Concept Technology Demonstration.

(U) The program goal is to achieve a significant improvement in training effectiveness required for reserve component maneuver force mobilization through the use of advanced distributed information technologies and innovative training strategies at a lower cost than current active component methods for conducting the same training. The intent is to develop and integrate technologies that enable National Guard soldiers to conduct sophisticated training either at the local community armory, or at the soldier's home. The program will capitalize on existing commercial technologies where feasible.

(U) **Program Accomplishments and Plans:**

(U) FY 1994 Accomplishments:

- Connected two test brigades to the Defense Simulation Internet (DSI). ($1.2M)
- Continued development of reconfigurable ground simulator. ($4.0M)
- Conducted field trials of brassboard location instrumentation and intervehicular communications technology. Executed partial Phase II effort to develop and test prototypes in unit testbeds. ($4.3M)
- Continued development of desktop equipment simulators and advanced technology distributed training capabilities. Priorities are on the maneuver battalion staff, forward support battalion staff, critical vocational skills of support personnel, brigade staff and small unit leaders. ($4.6M)
- Initiated connection of armories in the State of Iowa to the statewide fiberoptic network. ($10.0M)
- Intensified development of measures of performance and program evaluation research. ($3.0M)

(U) FY 1995 Program:

- Establish two test brigades on the Defense Simulation Internet (DSI). ($1.5M)
- Complete final functionality test of reconfigurable ground simulator. ($8.0M)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Simulation, National Guard PE 0603744?, Project SM-01

- Complete development and assessment of location instrumentation and intervehicular communications technology. ($5.5M)
- Continue development of desktop simulators and advanced technology distributed training capabilities and delivery technologies. ($11.1M)
- Continue development of measures of performance and conduct program evaluation research. ($3.4M)

(U) FY 1996 Program:

- Evaluate the operation of one test brigade on the Defense Simulation Internet (DSI). ($.5M)
- Continue modification and development of training programs and assessment prototypes. ($.8M)
- Continue development of desktop simulators and advanced technology research in distance learning and distributed training technologies. ($1.7M)
- Continue development of innovative program evaluation research technologies and methods. ($2.8M)

(U) **Program Change Summary**: *(In Millions)*

	FY 1994	FY 1995	FY 1996	FY 1997
President's Budget	27.1	20.9	5.8	14.7
Appropriated	27.1	29.5	N/A	N/A
Current Budget	27.1	29.5	5.8	0

(U) **Change Summary Explanation**:

FY 1997 Reduction reflects program termination.

(U) **Other Program Funding Summary Cost**: N/A

(U) **Schedule Profile**:

Plan	Milestones
May 94	Installed JANUS Brigade/Battalion Local Area networks.
Jul 94	Initiated Iowa armory connections to Iowa Fiberoptic Network.
Dec 94	Demonstrated proof-of-concept reconfigurable simulator.
Feb 95	Begin field trials of assessment tools.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Advanced Simulation, National Guard PE 0603744E, Project SM-01

Mar 95	Deliver enhanced virtual reality equipment simulators.
Mar 95	Verification and validation of initial reconfigurable full-crew simulators.
Apr 95	Establish and test DSI nodes for the two experimental brigades.
May 95	Evaluate ARPA-JANUS Wide Area Network Brigade Simulation technology.
May 95	Test Pen-operated Command and Control systems at experimental Brigades.
Jun 95	Test multi-media learning technologies for Staff Officer Training Systems.
Jul 95	Field initial Deployable Force-on-Force Instrumentation System.
Jul 95	Deliver draft assessment measures and plan.
Aug 95	Beta-test Brigade simulation scenarios.
Sep 95	Deliver prototype digital library.
Oct 95	Test MOS-specific distance learning technology.
Feb 96	Field Phase II Desktop Gunnery Systems.
Mar 96	Field final Deployable Instrumented Range System.
Aug 96	Evaluate performance of first experimental brigade at the National Training Center (NTC).
Dec 96	Deliver program assessment and final report.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Advanced Development	R-1 ITEM NOMENCLATURE Dual Use Applications Programs PE 0603805E

COST *(In Thousands)*	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Cost to Complete	Total Cost
Dual Use Applications Programs GC-01	0	0	0	300,000	300,000	300,000	300,000	300,000	0	0

(U) **Mission Description:** The objective of this program is to leverage emerging, dual-use (e.g. potentially viable in both commercial and defense applications) technologies to the direct benefit of military system acquisition. An important additional objective is to assure consideration of the dual-use approach as a routine part of DoD's R&D process whenever commercial technology is better able to meet DoD's cost and performance requirements. This program will be jointly executed by ARPA and the Military Services to ensure transition of the technology to the Services and, equally important, to embed the lessons learned from this program directly in the mainstream R&D approaches of the Military Departments.

(U) Technology thrusts will be selected jointly by ARPA and the Military Services and will be based on: (1) Potential of commercial technology development to meet Military Service needs and unique requirements; (2) Potential of a commercial technology to reduce product cost to the military; (3) Extent of opportunity for insertion of technology into DoD systems, subsystems or demonstrations; (4) Extent of multi-service interest; and (5) Viable transition plan for incorporation into military systems. Cost shared technology projects which best accomplish the program's objectives will be competitively selected, negotiated, and managed by a DoD team.

(U) ARPA and the Services will jointly select projects across all of the thrusts. Individual projects will then be managed by the appropriate Services, with technical and dual use process advice from ARPA, as appropriate.

(U) **Program Accomplishments and Plans**:

(U) FY 1997 Planned Program:

- In FY 1997, technology thrusts will be selected and competed. Initial projects will be selected and management will be assigned to the Military Services. Projects will be performed primarily with industry and/or industry teams with support from universities and military laboratories as appropriate. The Selection of new technology thrusts for FY 1998 will begin.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE July 1995
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defensewide BA 3 Exploratory Development	R-1 ITEM NOMENCLATURE Dual Use Applications Program PE 0603805E, Project GC-01

(U) FY 1998-01 Planned Program:

- Additional projects will be selected and management will be assigned to the Services.

(U) **Other Program Funding Summary Cost**: N/A

Format C-7: Industrial Base Program Funding

Advanced Research Projects Agency

(TOA $ in Millions)

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
1. Manufacturing Related Technology Investments									
0603739E									
Mantech/Industrial Preparedness	173383	192906	163343	160184	141220	125000	104951	95000	95000
0603746E									
Mantech/Industrial Preparedness	38750	52000	49657	49708	50000	0	0	0	0
0603747E									
Mantech/Industrial Preparedness	46250	15000	0	0	0	0	0	0	0
0603805E									
Mantech/Industrial Preparedness	0	0	0	300000	300000	300000	300000	300000	300000
Mantech/Industrial Preparedness									
0603570E	495502	443196	500000	0	0	0	0	0	0
2. Industrial Vulnerabilities									
Appropriation (3010)									
Mantech/Industrial Preparedness	0	0	0	0	0	0	0	0	0
Appropriation (3020)									
Mantech/Industrial Preparedness	0	0	0	0	0	0	0	0	0
MILCON									
Mantech/Industrial Preparedness	0	0	0	0	0	0	0	0	0
OMN									
Mantech/Industrial Preparedness	0	0	0	0	0	0	0	0	0
Appropriation (3080)									
Mantech/Industrial Preparedness	0	0	0	0	0	0	0	0	0
3. Industrial Facilities									
a. Acquisition of new plants and equipment									
Appropriation (3010)									
Appropriation (3020)									
Appropriation (3080)									

Format C-7: Industrial Base Program Fundir g

Advanced Research Projects Agency

(TOA $ in Millions)

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
MILCON									
OMN									
b. Current and future law-away of DoD-owned facilities									
Appropriation (3010)									
Appropriation (3020)									
Appropriation (3080)									
MILCON									
OMN									
c. Active facilities, includes:									
Appropriation (3010)									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects	0	0	0	0	0	0	0	0	0
(3) Construction	0	0	0	0	0	0	0	0	0
Appropriation (3020)									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects	0	0	0	0	0	0	0	0	0
(3) Construction	0	0	0	0	0	0	0	0	0
Appropriation (3080)									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0

Format C-7: Industrial Base Program Funding

Advanced Research Projects Agency

(TOA $ in Millions)

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
(2) Environmental projects	0	0	0	0	0	0	0	0	0
(3) Construction	0	0	0	0	0	0	0	0	0
MILCON									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects	0	0	0	0	0	0	0	0	0
(3) Construction	0	0	0	0	0	0	0	0	0
OMN									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(3) Construction	0	0	0	0	0	0	0	0	0
d. Laid-away facilities, includes:									
Appropriation (3010)									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects (if any)	0	0	0	0	0	0	0	0	0
Appropriation (3020)									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects (if any)	0	0	0	0	0	0	0	0	0

Format C-7: Industrial Base Program Funding

Advanced Research Projects Agency

(TOA $ in Millions)

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
Appropriation (3080)									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects (if any)	0	0	0	0	0	0	0	0	0
MILCON									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects (if any)	0	0	0	0	0	0	0	0	0
OMN									
(1) Modernization of existing DoD-owned facilities; Replacement and rehabilitation of existing facilities; Expansion of DoD-owned facilities; Energy conservation and management (MILCON)	0	0	0	0	0	0	0	0	0
(2) Environmental projects (if any)	0	0	0	0	0	0	0	0	0
e. DIPEC operations									
Appropriation (3010)	0	0	0	0	0	0	0	0	0
Appropriation (3020)	0	0	0	0	0	0	0	0	0
Appropriation (3080)	0	0	0	0	0	0	0	0	0
MILCON	0	0	0	0	0	0	0	0	0
OMN	0	0	0	0	0	0	0	0	0
4. Industrial Analysis and Planning									
Appropriation (3020)	0	0	0	0	0	0	0	0	0
Appropriation (3080)	0	0	0	0	0	0	0	0	0
MILCON	0	0	0	0	0	0	0	0	0

Format C-7: Industrial Base Program Funding

Advanced Research Projects Agency

(TOA $ in Millions)

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
OMN	0	0	0	0	0	0	0	0	0
Appropriation (3010)	0	0	0	0	0	0	0	0	0
5. Industrial Preparedness Measures									
Appropriation (3010)	0	0	0	0	0	0	0	0	0
Appropriation (3020)	0	0	0	0	0	0	0	0	0
Appropriation (3080)	0	0	0	0	0	0	0	0	0
MILCON	0	0	0	0	0	0	0	0	0
OMN	0	0	0	0	0	0	0	0	0
6. Title III									
Appropriation (3010)	0	0	0	0	0	0	0	0	0
Appropriation (3020)	0	0	0	0	0	0	0	0	0
Appropriation (3080)	0	0	0	0	0	0	0	0	0
MILCON	0	0	0	0	0	0	0	0	0
OMN	0	0	0	0	0	0	0	0	0
7. National Defense Stockpile									
Appropriation (3010)	0	0	0	0	0	0	0	0	0
Appropriation (3020)	0	0	0	0	0	0	0	0	0
Appropriation (3080)	0	0	0	0	0	0	0	0	0
MILCON	0	0	0	0	0	0	0	0	0
OMN	0	0	0	0	0	0	0	0	0

Format C-7: Industrial Base Program Funding

Advanced Research Projects Agency

ENDNOTES:

a. MT-Advanced Electronics Technologies
b. MR-01/Maritime Technology
c. EV-01/Electric Vehicles
d. GC-01/Dual Use Applications
e. PT-xx/Defense Reinvestment

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1994 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land Forces - Army Land Forces - Europe							
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	188.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	188.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1994 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	188.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1994 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	188.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	188.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	188.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1995 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	217.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	217.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1995 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	217.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1995 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	217.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1996 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	217.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	217.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1996 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	217.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1996 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	217.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1997 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	217.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	217.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1997 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	217.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1997 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	217.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1998 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	217.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	217.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1998 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	217.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0 0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1998 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	217.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1999 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	217.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	217.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1999 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	217.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 1999 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	217.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	217.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2000 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	211.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	211.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning and End Strength

Advanced Research Projects Agency

FY 2000 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	211.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2000 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	211.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	211.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	211.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2001 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	207.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	207.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2001 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	207.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2001 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	207.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	207.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	207.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2002 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
1 MAJOR FORCE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 STRATEGIC FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111 Strategic Offensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
112 Strategic Defensive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113 Strategic C3I	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114 Industrial & Stock Fund Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 GENERAL PURPOSE FORCES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
121 Land Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122 Tactical Air Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
123 Naval Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124 Mobility Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125 Special Operations Forces	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126 General Purpose Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127 Theater Missile Defense	0.0	0.0	0.0	0.0	0.0	0.0	0.0
128 Counter Drug Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	207.0
21 INTELLIGENCE & COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
211 Intelligence	0.0	0.0	0.0	0.0	0.0	0.0	0.0
212 Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22 GENERAL RESEARCH & DEVELOPMENT	0.0	0.0	0.0	0.0	0.0	0.0	207.0
221 Science & Technology Program	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2002 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
222 Undistributed Development Programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223 RDT&E Management & Support	0.0	0.0	0.0	0.0	0.0	0.0	207.0
23 OTHER DEFENSE-WIDE MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
231 Geophysical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232 Space Launch Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
233 Nuclear Weapons Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
234 International Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 DEFENSE-WIDE SUPPORT MISSIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 LOGISTICS SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
311 Supply Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
312 Maintenance Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
313 Other Logistics Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32 PERSONNEL SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
321 Personnel Acquisition	0.0	0.0	0.0	0.0	0.0	0.0	0.0
322 Training	0.0	0.0	0.0	0.0	0.0	0.0	0.0
323 Medical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
324 Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
325 Federal Agenct Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
326 Other Personnel Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33 OTHER CENTRALIZED SUPPORT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
331 Departmental Headquarters	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332 Retired Pay	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format A-8: Programmed Structure, Programmed Manning, and End Strength

Advanced Research Projects Agency

FY 2002 (In Thousands)

	ACTIVE		RESERVE		NATIONAL GUARD		CIVILIAN
	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manpower Structure	Programmed Manning	Programmed Manning
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	207.0
END STRENGTH SUMMARY							
End Strength in Units	0.0	0.0	0.0	0.0	0.0	0.0	207.0
Individuals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservists on Active Duty	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Undistributed	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL END STRENGTH	0.0	0.0	0.0	0.0	0.0	0.0	207.0

Format E-13: Environmental Security Technology

(Current $ Millions)

Advanced Research Projects Agency

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
I. Cleanup									
A. RDT & E									
6.1									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.2									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.4									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.6									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.7									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B. Mil Con	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C. O & M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D. Procurement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E. Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format E-13: Environmental Security Technology

(Current $ Millions)

Advanced Research Projects Agency

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
II. Compliance									
A. RDT & E									
6.1									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.2									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.4									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.6									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.7									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B. Mil Con	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C. O & M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D. Procurement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E. Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Subtotal	0.0	0.0	0.0	0.0	0 0	0.0	0.0	0.0	0.0

Format E-13: Environmental Security Technology

(Current $ Millions)

Advanced Research Projects Agency

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
III. Conservation									
A. RDT & E									
6.1									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.2 0602712E									
MPT-01, Materials Processing Technology	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3 0603226E									
EE-21, Command & Control Information Systems	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3 0603749E									
EC-01, Earth Conservancy	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.4									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.6									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.7									
Not Applciable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B. Mil Con	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C. O & M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D. Procurement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E. Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Subtotal	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format E-13: Environmental Security Technology

(Current $ Millions)

Advanced Research Projects Agency

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
IV. Pollution Prevention									
A. RDT & E									
6.1 0601101E									
MS-01, Materials Sciences	10.2	8.7	3.4	5.1	6.7	7.0	0.0	0.0	0.0
6.2 0602712E									
MPT-01, Materials Processing Technology	13.5	8.8	11.7	17.2	13.4	13.5	0.0	0.0	0.0
6.3 0603226E									
EE-21, Command & Control Information Systems	0.3	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3 0603569E									
AS-01, Advanced Submarine Technology	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3 0603570E									
PT-01, Dual Use Technology Partnerships	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PT-03, Commercial-Military Integration Partnership	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3 0603739E									
MT-04, Electronic Module	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.3 0603745E									
EM-01, Semiconductor Manuf Tech (SEMATECH)	14.0	9.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0
6.4									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.5									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.6									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.7									
Not Applicable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B. Mil Con	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C. O & M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D. Procurement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E. Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Subtotal	62.9	38.5	24.1	22.3	20.1	20.5	0.0	0.0	0.0

Format F-10: Civilian Employment Levels and Associated Payroll Costs

Advanced Research Projects Agency

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
Major Force Program 2									
1. Direct Hire (Civilian Workyears)									
a. US Citizens									
(1) Numbers (00's)	171.0	203.0	210.0	210.0	210.0	210.0	204.0	200.0	200.0
(2) Cost ($ 000's)	15512.0	19288.0	20670.0	21562.0	22152.0	22794.0	22924.0	23222.0	23932.0
b. US Citizen Reimbursables									
(1) Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Foreign Nationals									
(1) Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
d. Foreign Nationals Reimbursables									
(1) Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
e. Direct Hire Totals									
(1) Numbers (00's)	171.0	203.0	210.0	210.0	210.0	210.0	204.0	200.0	200.0
(2) Cost ($ 000's)	15512.0	19288.0	20670.0	21562.0	22152.0	22794.0	22924.0	23222.0	23932.0
2. Indirect Hire (Civilian Workyears)									
a. Foreign Nationals									
(1) Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b. Foreign Nationals Reimbursables									
(1) Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format F-10: Civilian Employment Levels and Associated Payroll Costs

Advanced Research Projects Agency

	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
3. Total (Civilian Workyears)									
a. Numbers (00's)	171.0	203.0	210.0	210.0	210.0	210.0	204.0	200.0	200.0
b. Cost ($ 000's)	15512.0	19288.0	20670.0	21562.0	22152.0	22794.0	22924.0	23222.0	23932.0
4. Total Reimbursables (Civilian Workyears)									
a. Internal to DoD									
(1) Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b. External to DoD									
(1) Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(2) Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5. Other Costs									
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6. End Strength									
	188.0	217.0	217.0	217.0	217.0	217.0	211.0	207.0	207.0
7. Total									
a. Numbers (00's)	171.0	203.0	210.0	210.0	210.0	210.0	204.0	200.0	200.0
b. Cost ($ 000's)	15512.0	19288.0	20670.0	21562.0	22152.0	22794.0	22924.0	23222.0	23932.0
8. Reimbursables									
a. Numbers (00's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b. Cost ($ 000's)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Format G-2B: All Other IT Costs by CIM Area(Category 5 only)

Science & Technology/None

CATEGORY: 5

(Current $ Millions)

Part 1 - Resource Baseline	Funding Source/Appropriation	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002
A. Development & Modernization										
	R, D, T and E-Defense Agencies	3.396	3.096	3.146	3.251	3.251	3.251	3.251	3.251	3.251
B. Current Services										
	R, D, T and E-Defense Agencies	3.870	4.040	4.193	4.502	4.502	4.502	4.502	4.502	4.502
C. TOTAL Resources										
	Funding:	7.266	7.136	7.339	7.753	7.753	7.753	7.753	7.753	7.753
	Manpower (by RIC):									
	Civilian	5	6	6	6	6	6	6	6	6

Format G-2B: All Other IT Costs by CIM Area(Category 5 only)

COMMENTS:

All Agency IT resources support the Science and Technology CIM Functional Area within the Agency. These resources are used to support the mission need of decision support for the identification and funding of high-risk, breakthrough, advanced technologies. The capabilities required to meet this need are achieved through programmed resources. As goals of system users change in this highly dynamic environment, resource levels are adjusted. All resource programming and adjustments are approved by the Agency Senior Information Resources Management Representative (SIRMR).

Funds for each Agency IT system fall beneath the threshold of $2 million per year. All other Agency IT is considered not a part of any definable system. Funds associated with all categories of IT are aggregated for this format.